THE TEXTILE MANUFACTURER

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Notes of the Month

INDUSTRIAL FIBRES.

WORLD production of the chief industrial fibres in the 1959-60 season is estimated to have risen by a further 5% to reach a new peak of some 43,100 million lb., according to "Industrial Fibres" (Commonwealth Economic Committee; H.M. Stationery Office, price 10s. 10d.). The increase applied to each of the main fibres, apart from jute. The review also includes preliminary information covering the 1960-61 season which indicates that, on balance, world output of industrial fibres will again be higher in aggregate than in the previous season. Increases are expected in hard hemps, jute, flax and man-made fibres, but wool and silk production are expected to be somewhat reduced and that of cotton to show little change.

In the 1959-60 season, output of the natural fibres showed an overall rise of some 3% compared with 1958-59, a 5% increase in the production of those for apparel, household and industrial purposes (wool, cotton, silk and flax) more than offsetting a 3% reduction in sacking and cordage fibres (hemp and jute). The man-made fibres showed a more pronounced increase of about one-sixth over their depressed 1958 level and aggregate output exceeded the earlier peak reached in 1957. In most instances Commonwealth production of the chief industrial fibres continued the trends which had been observed in earlier seasons. Its wool output rose to a new record, accounting for more than half the world total, and its hemp (sisal) and man-made fibre production continued to grow; in each of these fields the Commonwealth's share of the world total has been rising since the end of the war. By contrast, the Commonwealth's cotton and jute crops were considerably reduced, due to harvest failures in India and Pakistan.

Estimated world consumption of the main apparel fibres in 1959 rose by about 9% from the previous year's setback. The figures constituted a new record, with all the chief fibres showing marked improvements. Usage of wool, cotton and rayon increased by 14, 7 and 11% respectively, while much larger proportionate increases were recorded for the newer non-cellulosic man-made fibres and for silk. Among sacking and cordage fibres, usage of hard hemp and jute rose in each case by about a tenth. During the seasons ending in 1960 conditions were reasonably favourable in most of the textile manufacturing industries and the general trend was for stocks of raw fibres, with the exception of wool, to fall. Greater carry-overs in South America were largely responsible for an overall rise in supply stocks of wool in the chief producing countries. On the other hand, cotton, silk and jute stocks were much reduced, particularly in the latter two cases.

Table 1. U.K. Price Indices for Selected Industrial Fibres 1947=100 (except flax: 1952=100)

Calendar year	Wool	Cotton (American)	Silk	Flax	Sisal	Jute
1934-38 average	48	31	32	33	28	21
1955 ,,	225	155	136	88	107	102
1956 ,,	228	132	128	72	103	104
1957 ,,	257	124	126	67	95	119
1958 ,,	185	118	112	55	96	109
1959 ,,	194	105	112	60	119	105
1960 ,,	195	106	127	72	133	147

Prices.—During 1959-60 prices of most natural fibres experienced a good recovery following the widespread reductions which had occurred in the previous season. Prices of silk, flax, sisal and other hemp (Table 1) advanced steadily during the 1959-60 season and in the closing months of the season jute quotations rose very steeply when supply shortages became acute. Cotton was, for special reasons, the only major fibre not to share in the general improvement. In the early part of the 1960-61 season jute and silk prices rose further, sisal and flax remained firm, but abaca quotations weakened. Cotton prices were slightly higher than in 1959-60. Among man-made fibres, the U.K. price of viscose staple was reduced in May, 1959 to keep it competitive with cotton and that of high tenacity rayon was lowered a year later to keep it competitive with nylon. By contrast, prices of "Terylene" yarns were raised in June, 1959. Table No. 1 shows how prices of the main natural fibres have moved in recent years.

Production.—During 1959-60 the overall output of natural fibres in the free world rose by a further 3% compared with the previous season. Production of man-made fibres (in the calendar year 1959) fully recovered from the previous year's setback and increased by 17% to an all-time record; their share of aggregate production rose by two points to nearly 19%. The Commonwealth provided a slightly larger proportion of world output of wool, man-made fibres and hard hemp, but a smaller

Table 2. Total Production of Industrial Fibres in the Free World (thousand million lb.)

	Pre-war average	Average 1946-47 to 1950-51	1958-59	1959-60
Wool (clean basis) ..	1·8	1·9	2·5	2·6
Cotton	11·6	10·6	14·2	15·2
Rayon and acetate—				
Filament yarn ..	1·0	1·5	1·8	2·1
Staple fibre	0·4	0·9	2·3	2·5
Nylon and other man-made fibres	—	0·1	0·9	1·2
Flax	0·2	0·2	0·2	0·2
Hemp (including sisal)	1·8	1·7	2·1	2·2
Jute (incl. allied fibres)	3·3	3·4	5·3	4·8
Total *a* ..	20·2	20·2	29·3	30·9
Man-made fibres as per cent. of total	6·9	11·8	16·9	18·8

a including silk, which has not been shown separately

proportion of its cotton and jute. Commonwealth countries continued to produce the great bulk of the world's jute, although the quantities grown in China, Thailand and certain other countries are increasing.

Among the chief apparel fibres, *wool* production during 1959-60 in the non-Communist world rose by a further 5% compared with the previous season (Table 2). The increase was shared almost equally by apparel (merino and crossbred) and carpet class wools and was mainly due to the larger clips in Australia, New Zealand and the U.S. *Cotton* production during the same season was 7% larger than in 1958-59 and here the increase was largely concentrated in the U.S., where output rose by a quarter as a result of the considerable expansion in acreage following the introduction of a more flexible price support programme. By contrast, *silk* production fell by 4% from the previous season's post-war peak, mainly as a result of smaller Japanese output following Government measures to reduce output during the 1958 textile recession. As already mentioned, output of *man-made fibres* rose by 17% during 1959 to a new peak, the total including an increase of 12% in that of *rayon and acetate* and one of 40% for the newer *non-cellulosic fibres* (nylon, "Terylene," "Orlon," "Acrilan," etc.). The capacity of the industry is being further expended in all the major producing countries, and by the end of 1961 it is expected to be almost twice as great as the volume of actual output in 1959. Production of non-apparel fibres, on the other hand, dropped by about 5% in 1959-60, with a fall of 9% in output of *jute and allied fibres* offsetting a 4% improvement in that of *hemp* (including sisal).

Trade.—The Commonwealth is an important supplier of industrial fibres to the rest of the world. The great bulk of the raw jute entering international trade is of Commonwealth origin, together with just over three-quarters of the wool, nearly two-fifths of the hemp, and about a tenth of the cotton and man-made fibres. Special sections in the review describe changes in the position of the U.K., the U.S., the six Common Market countries of Western Europe and the seven member countries of the European Free Trade Association (E.F.T.A.) as markets for Commonwealth fibres.

A substantial proportion of the U.K. imports of wool, hemp, jute, coir and kapok are of Commonwealth origin but a much smaller share of its cotton, mohair and man-made fibres. About 80% of this country's wool and hemp supplies are normally drawn from the Commonwealth and virtually all its jute, coir and kapok. In the case of the United States, about two-third of her imports of wool and the bulk of the raw jute and jute manufactures come from Commonwealth sources, but much smaller proportions of other fibres. There was an increase both absolute and relative in the volume of United States fibre imports from the Commonwealth in 1959 following the previous year's recession. Nearly all Western Europe's supplies of raw jute normally come from Commonwealth sources, together with between 70 and 80% of its wool and just over a third of its hemp. On the other hand only fairly small quantities of Commonwealth cotton are imported and both "the Six" and "the Seven" are themselves substantial producers of man-made fibres and "The Six" also manufactures jute goods. Both of the latter commodities are protected by relatively high import duties. Table 3 shows the percentages supplied by the Commonwealth of total imports of the main raw fibres into the U.K., the U.S., the "Six" and the "Seven" in 1956 and 1959.

Table 3

	U.K.		U.S.		Common Market		E.F.T.A.	
	1956	1959	1956	1959	1956	1959	1956	1959
Wool ..	82	81	51	69	80	76	72	72
Cotton ..	18	15	18	11	7	5	2	6
Jute ..	100	99	99	99	97	89	97	93
Hemp ..	80	79	9	13	38	32	43	40*a*

a in 1958

* * *

WORLD CONGRESS OF MAN-MADE FIBRES

"THE IMPACT OF MAN-MADE FIBRES IN THE HOME" is to be a major, recurring topic at the Second World Congress of Man-Made Fibres in London, May 1 - 4, 1962. Six speakers from various countries, each an expert on one or more aspects of soft furnishings from design to the textile end-products in the home, are to address the Congress of over 2,000 delegates.

From the standpoint of consumers, the broad field of textile home furnishings will be reviewed by Mrs. Astrid Sampe of Nordiska Kompaniet A.B., Stockholm's leading department store often referred to in the international retail trade as the "Harrods of the North." Mr. Runar Hernberg, chairman of Uniwool, the Finnish wool combine, and also chairman of both the Finnish Textile Council and of the Finnish Design Association, is expected to address the congress on the contribution of textiles to the modern home, with particular reference to man-made fibres, and also their blends with natural fibres. In addition to these important contributions from Scandinavia on the role of man-made fibres in the home, other speakers scheduled include Mr. Isadore Barmash, editor of *Home Furnishings Daily*, published in the U.S.A.

The subject of man-made fibres in curtains and drapes is to be discussed by Mr. A. Bodin, of Bodin, Girin & Cie., Tarare, France. Domestic textiles is the title of a paper which will be given by Mr. Jacques de Witte of Belgium. Man-made fibres in carpets is expected to be the subject of an address by Dr. Ulrich Enke of Plüschweberei G.m.b.H., near Krefeld, Germany. Apart from the emphasis to be given to man-made fibres in home furnishings, the broad aim of the congress next year is that of consolidating the interests of all sectors of the textile and allied industries, and of consumers.

The Congress is sponsored and organised by the 21 member countries of the Comité International de la Rayonne et des Fibres Synthétiques, generally known as C.I.R.F.S., with its headquarters in Paris. Colonel F. T. Davies of the U.K. is president of C.I.R.F.S. Delegates from some 50 countries, representing all sectors of the textile industry, allied trades, international and inter-governmental organisations, are expected to attend the Congress, which is by invitation only.

The delegates will take part in a work programme of 22 lectures and discussions under the theme of "The Impact of Man-Made Fibres." The plenary sessions of the congress will be held in the Royal Albert Hall. The working sessions will take place at the Connaught Rooms. Member countries of C.I.R.F.S. are: Argentina, Australia, Austria, Belgium, Brazil, Canada, Finland, France, Federal Republic of Germany, Italy, Japan, Mexico, The Netherlands, Norway, Spain, Sweden, Switzerland, United Arab Republic, U.K., U.S.A. and Uruguay.

Fibre Origin, Production, Qualities and Classification

Points discussed in this first article include the areas of production, methods of collections, main features of the fibre, quality and classification, principal faults, factors governing price, and quality assessment at mill level

By C. M. WATSON, A.T.I., C.G.I.A.*

IN keeping with the widespread industrial development and economic advancement achieved in most countries of the world during recent years, jute has tended to become more and more prominent from a commercial point of view. The many outstanding characteristics of the material in combination with its spinning capacity over a wide range of counts of yarn, and subsequent applications, have tended to give it considerable prominence. These factors have been amplified and materially assisted by the fact that more than 100 years of development work has been given to the growing, grading, marketing and manufacturing aspect of its production. Thus, of all the natural fibres used in spinning and weaving, jute ranks next to cotton in respect to the world tonnage of fibre and goods produced for textile purposes. Unlike many other natural fibres in common use, jute has so far only been produced satisfactorily on a commercial basis in the north-east corner of the Indian sub-continent.

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Table 1

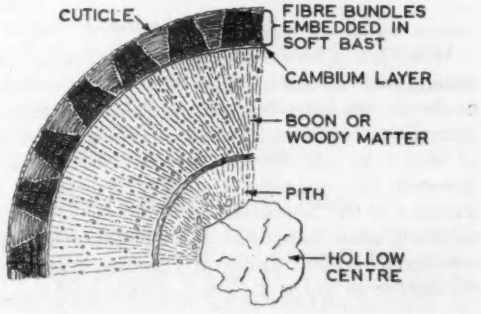
District	Type	%	Total
Dinajpur	Northern	4·5	
Rangpur	„	12·5	26·8
Rajshahi	„	5·8	
Bogra	„	4·0	
Mymensingh	Jat	23·8	
Dacca	„	11·2	44·0
Tipperah	„	9·0	
Pabna	District	5·2	
Sylhet	„	1·5	
Kustia	„	2·5	
Faridpur	„	9·0	
Jessore	„	5·5	29·2
Noakhali	„	1·5	
Khulna	„	1·5	
Bakergang	„	2·0	
Chittagong	„	0·5	

(left) **Fig. 1. The jute plant—Corchorous Capsularus**

The Fibre

Jute is an annual plant grown from seed and is the name given to both the plant and the fibre obtained from the plant. The fibre obtained from the commercial varieties, Corchorous Capsularus (white jute) and Corchorous Olitorius (tossa and daisee) is contained in the bast or bark of the plant stem and consists of bundles of fibres held together by incrusting matter and gums. As will be

Fig. 2. Fibre bundles in wedge-shaped groups with base of wedge towards core. Thirty wedges in cross section, with 15 layers of bundles in each wedge. Dry fibre equals 4 to 6% the weight of the green crop



observed from Fig. 1, the leaves have long footstalks, are oval, acuminate, thin, light green in colour, and have serrated margins with the two lower serratures terminating in narrow filaments. The leaves of C/capsularus taste bitter while the leaves of C/olitorius taste sweet. The seed pods also differ, those of C/capsularus being globular, wrinkled and muricated, in diameter about $\frac{1}{2}$ in., while those of C/olitorius are long tapering to a peak, about the thickness of a quill, $\frac{1}{4}$ in. by 3 to 4 in. long.

The dimensions of a fundamental single cell in jute is much less than in cotton and it is this short length of ultimate fibre which places limitations on its manufacturing properties. In jute the single cells are joined in a matrix of gummy matter, Fig. 2, as a result of which the fibre appears and behaves as if it were longer. Because of this feature jute is termed a compound fibre. The fibres taper towards each end and overlap one another producing a very compact compound structure. The bundles branch and re-unite from higher to lower levels in the stem producing a matrix or mesh work. The existence of this mesh work provides difficulties in spinning and dictates, to a degree, the method of converting the raw fibre into yarn as the meshes have to be broken down in carding re-arranged in drawing, regularised in doubling and twisted in spinning.

Fibre Production

The area under jute production extends from the Bay of Bengal to the foothills of the Himalayas and from Champaran and Orissa in the west to Lakimpur and Assam in the east. This has been extended since partition to include Uttar Pardesh and other suitable areas in India. Approximately one-tenth of the arable land in East Pakistan, including one-third of that in Mymensingh, is cultivated for jute. Some indication of the distribution of jute fibre production may be obtained from the 1947 - 1950 estimates given in Table 1.

The average land holdings of jute growers is approximately $2\frac{1}{2}$ acres of which only small plots are used for jute, and the average production of fibre by the individual grower ranges from 10 to 20 maunds (1 maund = 82·28 lb.) per year. The out-turn or yield of fibre per acre depends upon soil, rainfall, distribution of rainfall during the growing period, temperature, humidity and husbandry. One thousand to one thousand and 200 lb. of fibre per acre being considered a good average.

The outstanding feature of jute fibre is its variability, caused by differences in environmental conditions and also by conditions pertaining during the period of fibre extraction. Fibre extraction by retting presents many opportunities for fibre damage due to variations in degree of stagnancy, temperature, acidity and alkaline content of the retting water, all of which may affect the fibre either in colour or quality. Differences of this nature are of grading and manufacturing significance.

Fibre Collection

When jute is forwarded from the producing centres it is usually packed loosely, either in the form of kutcha bales or drums, the latter being a bundle of jute fibre weighing approximately one maund and consisting of different types of fibre. As jute fibre is delivered to the balers in an unsorted and ungraded condition this entails first, the selection of the unassorted fibre into the established commercial grades. In addition to classification of loose jute by commercial grades, distinctions are also made according to the district in which the jute has been produced.

The initial apprisal of fibre quality is as follows:—

"*Jat*".—Fibre produced in the districts of Mymensingh, Dacca, and Tippera, recognised as the finest quality of jute fibre.

"*District*".—Fibre produced in the districts of Faridpur, Bakergang, Noakhali, Chittagong, Chittangong Hill Tracts, Sylhet, Pabna, Khulna, Jessore and Kushtia, recognised as a quality inferior to "Jat" but superior to "Northern."

"*Northern*".—Fibre produced in the districts of Rajshai, Rangpur, Dinajpur and Bogra, fibre of an inferior quality.

Main Features and Quality

Fibre Length.—A good length fibre which allows for the removal of the basal portion without leaving a short length for manufacturing purposes. Commands a higher price than a shorter fibre of the same character. Medium qualities 6 to 8 ft., better qualities 10 to 12 ft. A factor of importance when processing over a Goods jute spreader.

Strength.—Jute fibre is not particularly strong when compared with some other bast fibres, but it has good tensile properties, but limited extensibility. Jute tends to become hard and brittle and breaks off with abrasion. Resistance to mechanical wear is low, and it is not specially durable on exposure to moist warm humid conditions. Storage and moisture deteriorate strength, a matt and pitted surface indicating a dead nature reveals weak fibre.

Lustre.—An index of quality, fairly high in the better types.

Fineness.—Associated with fineness in the reed. A coarse fibre in jute refers to grain or structure rather than thickness. Handle, softness and silkiness are terms closely allied.

Colour.—The best varieties are pale white to yellow or silver grey, commoner types brownish or greenish, inferior butts or roots usually much darker and possessing inferior lustre.

Colour Uniformity.—Uniformity in colour is a distinct feature in the better types. Inferior grades very irregular.

Roots.—The basal portion of the stem is more rigid and has a stronger supporting bark than the rest of the stem due to longer exposure and action of sun and water. In superior grades this portion is removed by cutting and baled separately; as cuttings.

Cleanliness.—Adhering portions of bark, specks and general cleanliness of fibre are looked for in good grade fibre types, and according to their degree of presence the grading is influenced.

Fibre Classification

Fibre grading or classification is dictated by the qualitative demands of the jute mills. Jute mills in the U.K. purchase fibre on the basis of grading known as pucca assortment. Shippers who supply jute to local mills buy their requirements either through their own agents or from beparis,[1] merchants or kutcha balers on the basis of kutcha assortment. The agents[2], beparis, merchants[4] and kutcha balers[5] in turn buy jute from farias[3], itinerary merchants and stockists who buy from the cultivators. The bulk of the fibre is sold by the growers on "estimation of quality."

Classification of fibre at various levels from cultivator to mill:—

Classification at Cultivators Level.—The grower classifies his fibre according to varieties, colour, cleanliness, length and strength. Tossa and White jute are kept separate.

Classification at Faria's Level.—The Faria's re-assort the fibre and sell to kutcha balers, agents or shippers.

Classification at Kutcha Balers Level.—The Kutcha baler assorts the fibre on the following grade standards:—

(1) Top
(2) Middle
(3) Bottoms
(4) Cross Bottom
(5) Rejections

Composition of Grades

	Cuttings not to exceed White	Tossa
Top.—Sound fibre, strong of excellent colour and lustre, good length, free from all blemishes	15%	10%
Middle.—Strong sound fibre, fair length, good colour of the district, free from samla, good lustre free from speck, runners, and harsh crop end	15%	10%
Bottom.—Sound fibre, fair length, average colour of the district free from grey and dark grey and free from weak fibre, speck and runners	20%	15%
B. Bottom.—Sound fibre of any colour, free from hard centred jute and runners	30%	20%
C. Bottom.—Fibre of medium strength of any colour, free from runners and heavy crop end	35%	25%
X. Bottom.—All weak, hard centred jute of fair length, free from runners tangled or ravelled jute and stick or hunks	—	—
Rejections.—Jute not falling under any of the above grades	—	—
Habijabi.—Tangled and ravelled jute	—	—

Classification at Pucca Balers Level.—In Pucca bales the root end is cut off and only clean fibre is packed.

	White Jute	
Dundee First	Type	Unquestionably "Jat."
	Weight	Heavy.
	Strength	Unquestionably strong.
	Colour	Regular and natural light.
	Cleanliness	Strictly clean, clean cut jute so that fibre of unquestionable quality remains.
	Moisture	Strictly dry. Nothing questionable is allowed.
Dundee Lightnings.	Type	Strictly "Jat."
	Weight	Heavy.
	Strength	Strong.
	Colour	Generally light.
	Cleanliness	None except slight blemish.
	Root	May be cut up to red, slight reddish colour towards the bottom permitted.
Dundee Hearts	Type	Strictly "Jat."
	Weight	Heavy.
	Strength	Strong.
	Cleanliness	Occasional minor blemish permitted.
	Roots	May be cut up to red, hard "but" to be cut.
Mill Reds	Fibre weighty, strong, good reddish colour, clean cut, same characteristics as for Dundee Firsts in its class.	
Mill Firsts	Fibre strong, fair colour, moderately weighty, clean cut (should be about Dundee Lightnings in its class).	
Mill Lightnings	Fibre fairly strong, average colour. Moderate blemish, including some roots; about 2½% cuttings allowed. Slight wiry crop end allowed.	
Mill Hearts	All classes of jute not falling under the above.	
	Tossa	
Dacca Tossa 2/3	Type	Unquestionably "Jat."
	Weight	Heavy.
	Strength	Unquestionably strong.
	Colour	Regular natural golden.
	Cleanliness	Strictly clean.
	Moisture	Absolutely dry.
Dacca Tossa 4	Type	"Jat."
	Weight	Heavy.
	Strength	Strong.
	Colour	Regular light.
	Cleanliness	None except slight blemish.
	Moisture	Dry.
	(Corresponds approximately to Dundee Lightnings in its class.)	
Dacca Tossa 5	Halfway between Dundee Lightnings and Dundee Hearts.	
Dacca Tossa 6	About half grade lower than Dundee Hearts, permitting more blemish than Dundee Hearts.	
Dundee Tossa 2/3 (short group)	Type	District, heavy, strong, natural colour, clean cut and dry. (Corresponds to Dundee First in its class.)
Dundee Tossa 4 (short group)	Type	District. (Corresponds to Dundee Lightning in its class.)
Dundee Tossa 2/3 (full group)	Type	District and Northern. (Corresponds to Dundee Firsts in its class.)
Dundee Tossa 4	Type	District and Northern. (Half grade lower than Dundee Hearts.)
Outport Tossa 2/3	Type	Northern. (Corresponding approximately to Lightnings.)
Outport Tossa 4	Type	Not falling under any of the above grades.

Pucca Bales: Commercial grades of fibre in descending order of value:—

White Jute. C/Capsularus	Tossa Jute. C/Olitorius
Dundee Firsts	Dacca Tossa 2/3
Dundee Lightnings	Dacca Tossa 4
Dundee Hearts	Crack Tossa 2/3
Mill Reds	Crack Tossa 4
Mill Firsts	Dacca Tossa 5
Export Firsts	Dundee Tossa 2/3
Export Lightnings	Dundee Tossa 4
Export Hearts	Dacca Tossa 6
	Outport Tossa 2/3
	Outport Tossa 4

Cuttings	Daisee Jute
Superior N.C.	Crack Daisee 2/3
S.N.C.	Grade Daisee 2/3
N.C.	
M.C.	

Rejections
Cut Ropes
Habi Jabi
S.M. Rejections
D.T.C.

Principal Faults Found in Jute Fibre

Very Short Jute.—Due to cultivation in the same soil, bad seed, poor soil or drought.

Dazed Fibre.—Weak fibre lacking in lustre.

Croppy.—The top end of the jute is hard and wiry, usually found in early shipments, due to under retting.

Hunka or Stick.—Pieces of hard bark left on the fibre, together with pieces of woody tissue remaining after stripping. Due to irregular retting.

Knotty.—A knot is a portion of the fibre agglutinated, which resists separation, due to insect bite or puncture on the growing plant.

Barky or Bukchhal.—The fibre is covered with a hard coarse bark and is itself hard and gummed together.

Runners.—Long hard barky ribbons of fibre, caused by faulty growth or faulty retting.

Rooty.—The lower part of the fibre in which the bark and gums are not wholly removed.

Mossy.—Lowland swamped jute with extraneous adhering matter.

Samla.—Refers to colour, usually dark and irregular.

Faults Detected at Manufacturing Point

Heart Damage.—The centre of the bale badly tendered and reduced in some cases to powder, caused by jute having an excess of moisture when baled. Under this condition the bale weighs lighter and emits a musty smell.

Exterior Damage.—Colour and quality deterioration on outside of bale, due to bale having been packed against ship's side and generating moisture and heat.

Make-up of Bales

To facilitate transport jute fibre is made up into convenient bales.

(1) For local consumption, fibre is made up into either drums of 1 to 2 maunds (82 to 164 lb.) or Kutcha bales of 3 maunds (264 lb.). This fibre is uncut and requires a selecting grading and stricking-up operation previous to softening, no jute opening machine being required.

(2) For Export, fibre is made up into Pucca or export bales of 400 lb. (including 6 lb. for binding ropes).

Export bales contain cut fibre of one quality, so assorted that the receiver knows, with reasonable certainty to what purpose the fibre may be put, eliminating to a degree selecting of fibre preparatory to processing.

Pressing Pucca or Export Bales

In assorting and grading jute fibre for export the basal portion of the stems is cut off and the ends hackled or combed over a coarse comb of ½ in. dia. × 12 in. steel pins set in a wood block. After hackling the fibre is made up

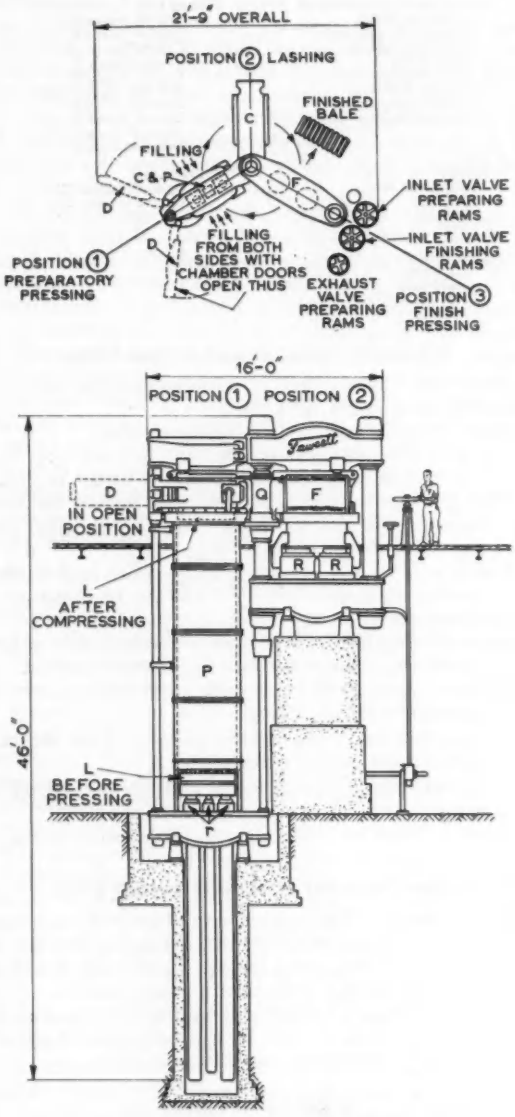
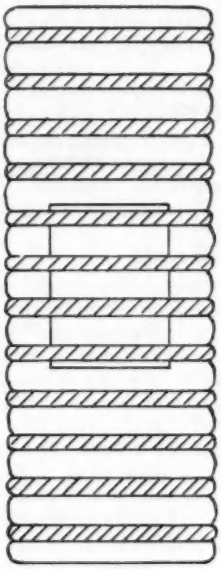


Fig. 3. The "Cyclone" jute baling press

into moras and the moras are again made up into bojahs of approximately 100 lb. The bojahs are then carried from the assorting sheds to the top floor of the press house, Fig. 3. Two lots each of 200 lb. are weighed on scales, usually placed on either side and adjacent to the filling box of the press. Four operatives, two on each side of the filling box place the jute into the box in alternative arrangement. As the bojahs are being placed into the box itself the press rams in the top table are slowly descending within the box and the box eventually is filled up with 394 lb. of jute. The top doors of the preparing side of the press are now closed and the jute is given a preliminary pressing in this compartment.

The lightly compressed bale which is carried in the revolving chamber at the top of the press is now swung round to an intermediate position where it is preliminary lashed with jute rope. A further 120° turn of the revolver turns the partially baled jute to a position immediately



(left) Fig. 4. Jute fibre in Pucca or export bale

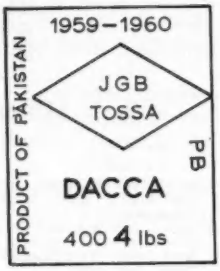


Fig. 5. A specimen mark

above the high pressure cylinders. These cylinders then exert the final pressure to the bale and while in this compartment the ropes are tightened and the ends laced in. The cylinders are then exhausted and the bale expands lightly taking up any stretch or slackness in the ropes. The bale is then discharged from the press and carried down a chute from the top floor to road level preparatory to shipment or storing. One press with one set of 8-unit pumps will press about 80 - 90 jute bales per hour. Two presses with one set of 8-unit pumps will press about 140 - 150 jute bales per hour.

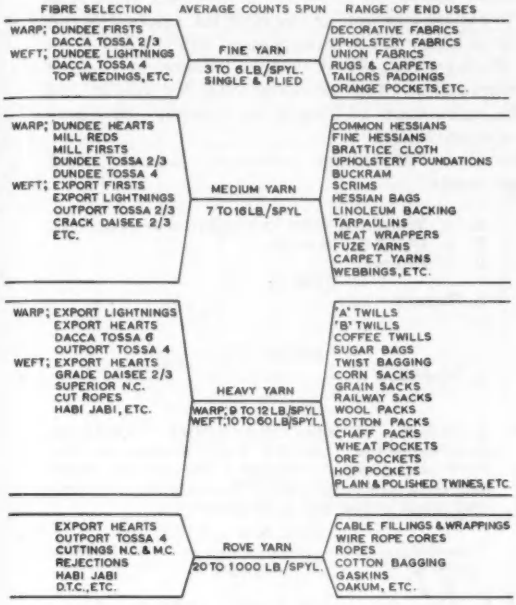
Jute Fibre in Pucca or Export Bale

Weight of bale, 400 lb. Metric equivalent, 180 kilos.
Dimensions: 4 ft. 1 in. × 1 ft. 6 in. × 1 ft. 6½ in. = 9·443 cub. ft.
Density, 43 lb. per cub. ft.
Moisture regain of fibre, 13·75%.
Binding ropes 200 ft. × 5 to 7 strand, weight 6 lb. (see Fig. 4).

The bale mark, Fig. 5, is made from hessian cloth. "Marks" distinguish qualities and may consist of letters, either alone or in some geometrical design such as a circle, oval, diamond, square, triangle, double triangle or heart, and printed in either black, blue, brown or green. Marks are arranged in groups in order of value. Each baler or each firm who employs a baler has a number of distinctive marks by which the grade of jute which he bales will be recognised. Balers guarantee their jute equal in quality and similar in grade to the same specified marks shipped at the corresponding time two seasons previous. Failure to maintain this standard may render the jute the subject of arbitration to re-adjust the value. Quotations given in newspapers and market reports are for an English ton, c.i.f. London, Dundee or Hamburg for early shipment from Pakistan.

Factors Governing Price

Prices fluctuate according to supply and demand. Fibre price, fibre quality and processing performance are factors closely related and of significant importance. The demand



(left) **Fig. 6. Utility flowgraph**

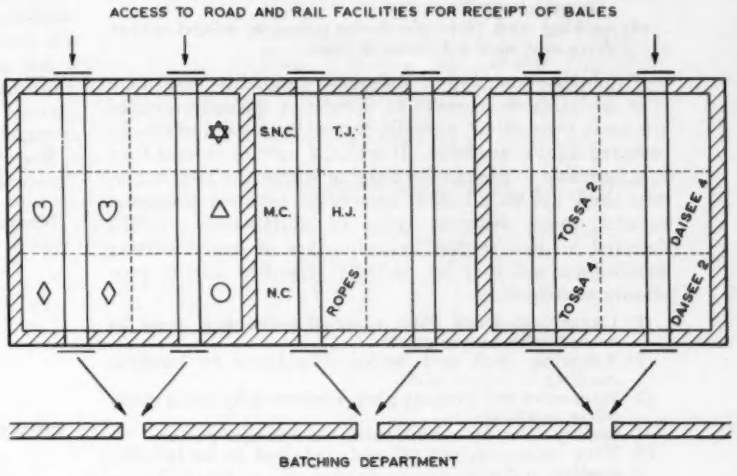


Fig. 7. Warehousing of raw jute in bale form. Bales stacked clear of floor and 12 to 18 in. clear of walls

for jute goods is a derived one, influenced by seasonal changes, and is susceptible to the effects of economic forces on the many commodities for which those goods are used.

The manufacturing industry has to study carefully the conditions governing the demand for jute goods and the price ceiling available and balance this against the current price of the raw material. Blending of price and quality of raw fibre to obtain an optimum relationship of yarn strength to yarn count acceptable for the commercial end product contemplated is of primary importance. Supply and demand is influenced by:—

(1) Seasonal conditions pertaining in the growing areas.
(2) Price of the finished fabric.
(3) Condition of the ultimate consuming markets.
(4) Tariff policies of the various consuming countries which aim at fostering indigenous fibres.
(5) Excess or failure of crops in any part of the world.
(6) Overproduction, resulting in the accumulation of unsold stocks of finished goods.

Fibre variables affecting quality and the ultimate value of the fibre include variations in strength, length, colour, proportion of root, cleanliness and moisture content. The characteristics peculiar to the fibre of certain growing areas affect the respective manufacturing values. This fact is responsible for one class of fibre commanding a higher price than another. Price differences are based on the considered opinion of the manufacturers regarding the spinning qualities of the various classes or marks of fibre, and their potential end uses.

Utility Value of Jute Fibre

The commercial appeal of jute fibre is influenced by:—

(1) Low price of raw fibre.
(2) Availability in quantity.
(3) Low price of finished article.
(4) Comparative regularity of quality.
(5) The spinning capacity of the fibre over a wide range of counts.
(6) Simple to fabricate, spin and weave.
(7) Manufacturing wastes can be utilised.
(8) With new type of machinery quality yarns can be produced with comparatively unskilled labour.
(9) Affinity for dyes.
(10) Multiplicity of applications, demonstrated by the utility flowgraph (Fig. 6).

Quality Assessment at Mill Level

Warehousing.—As jute is an annual crop, arriving at the mill in quantity from September to March, storage facilities must be designed according to the manufacturing capacity of the mill in terms of number of bales of the respective marks required to produce the commercial end products anticipated over the period of one year.

In storing the bales, marks or qualities should be arranged for easy check and removal (Fig. 7). The period of storage is nominally from six weeks to eighteen months, except for daisee types which show deterioration after two to four months. Colour changes peculiar to jute from certain districts or growing areas should be the deciding factor regarding period of storage.

Mill Inspection.—On arrival at the mill of the first parcel of a particular lot selected bales are inspected by the mill personnel who open a small percentage and note "condition of fibre."

Condition of Fibre.—This is a general term referring to such characteristics of the fibre as are influenced by the place of origin, and by the manner in which the jute has been cultivated and prepared for the market.

Discriminating factors include the following:—

(1) Hard, fibre of firm texture free from fluffiness.
(2) Soft, fibre which is soft to the hand, the strands of which do not separate cleanly on account of fluffiness.
(3) High colour, light lustrous fibre.
(4) Low colour, drab brown or dark grey colour fibre.
(5) Short, fibre which is below 5 ft. in length, after cutting of roots. The nominal length of good quality fibre is from 8 to 10 ft., after cutting of roots.
(6) Incidence of roots and runners.
(7) Excess moisture, if evident.

The fibre should also be assessed in terms of spinning quality. Spinning quality or manufacturing designations include:—

(1) Hessian warp, strong fine fibre of superior quality, clean, with good lustre and light and regular colour.
(2) Hessian weft, inferior to warp in strength, but otherwise somewhat similar.

(3) Sacking warp, good strong fibre, clean, of inferior and mixed colour.
(4) Sacking weft, fibre of inferior strength, mixed colour, dirty and unfit for other grades.

To obtain agreement of judgment in quality assessment it is advisable to inspect the fibre in a specially selected site away from direct sunlight, but where a good north sky reflected light is available. If artificial lighting is used then it is desirable to use similar lighting within the mill, otherwise there will be a lack of agreement between judgment formed under different types of illumination. Faults detected in fibre during inspection are of manufacturing significance and may be partially remedied during processing as follows:—

(1) Dazed and weak fibre, a small percentage may be mixed with better grades.
(2) Adhering stick and wood, eliminated by suitable carding.
(3) Immature and gummy fibre, improved by using more oil in batching.
(4) Specky fibre, by conditioning for a longer period.
(5) Wiry crop end, cut off and included in an inferior quality.
(6) Bark and runners, cut off and used in lower qualities.
(7) Transit damage, by selecting and mixing.

Early shipment of fibre is superior in colour and quality due to fibre extraction being carried out under ideal conditions.

Moisture in Jute

In common with all textile fibres jute will absorb moisture relative to the condition of the atmosphere to which it is exposed. Excess moisture detected in pucca bales of jute may be due to having been packed during the latter part of the monsoon season when humidity is high. The official regain chosen for jute fibre as the most useful for commercial purposes is 13·75% with an equivalent moisture content of 12·088%.

To correctly assess the moisture in raw jute fibre it is necessary to expose a sample of the fibre for a period of not less than three hours at a temperature of 225° to 230°F. in a hot air drying oven, fitted with a balance to register moisture evaporation. This gives the oven dry weight, and permits the calculation of "moisture content" or "percentage moisture content."

Formulae for "percentage moisture content" and "percentage regain":—

Where: **X = Weight of fibre in condition as received.**
Y = Oven dry weight.
R = Regain.

$$\%\ \text{Regain} \quad .. \quad \frac{100\,(X - Y)}{Y}$$

$$\%\ \text{Moisture} \quad .. \quad \frac{100\,(X - Y)}{X}$$

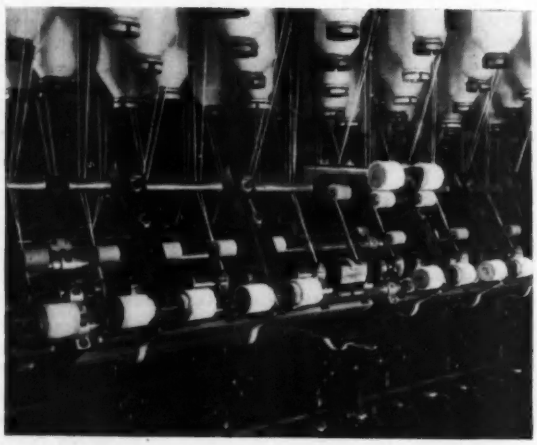
Example: A sample of jute fibre before "condition determination" weighs 3,624 grains, in the oven dry state it weighs 3,140 grains, what per cent. moisture does the sample contain, and what is the per cent regain?

$$\%\ \text{moisture} \quad .. \quad \frac{100\,(3{,}624 - 3{,}140)}{3{,}624} = 13{\cdot}36\%$$

$$\%\ \text{regain} \quad .. \quad \frac{100\,(3{,}624 - 3{,}140)}{3{,}140} = 15{\cdot}4\%$$

References:
(1) Bepari — A trader who operates from the headquarters of an Aratdar, and who possesses no storage facilities of his own.
(2) Aratdar — A commission agent who sells, at his own discretion, fibre sent to him by the Beparies.
(3) Faria — A dealer who buys direct from the cultivator or Raiyot, or from the district markets.
(4) Dalal — Brokers who negotiate sales and purchases.
(5) Kutcha Balers — Dealers who own or hire establishments up-country for the pressing of kutcha bales.

Fibre Control in Drafting Zone



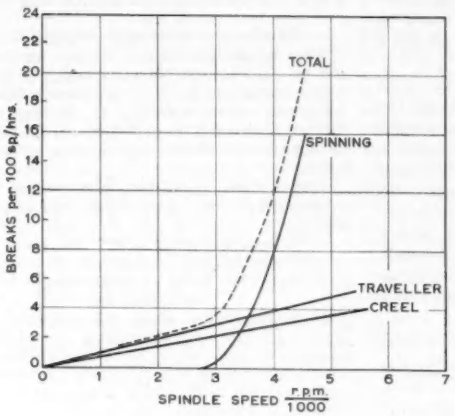
Close-up of the new drafting element

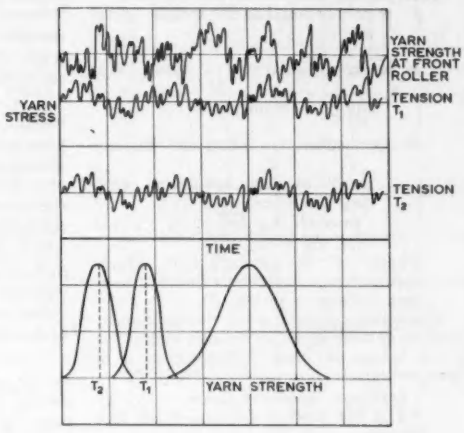
THE new SG-3D double apron spinning changeover, recently announced by Saco-Lowell Shops, Greenville, S.C., U.S.A., is for converting all Gwaltney spinning frames equipped with the original single apron SG-1 or Shaw system to the Duo-Roth system. The SG-3D changeover is said to provide more effective control of the fibres in the draft zone and also to produce a better quality yarn. The new drafting element incorporates all of the anti-friction features of the present SG-3 Duo-Roth system.

The angle of the roll stand in respect to the horizontal remains at 60° and utilises the original Gwaltney top arm weighting, reducing the number of parts required for most changeovers. The changeover is therefore relatively simple to install and requires a minimum of down time per frame. The first Gwaltney frames were equipped with SG-1 or Shaw system which gave way some years later to the improved Duo-Roth system. The company point out that the Duo-Roth produced better yarn than the SG-1 and is claimed to be ideal for high drafts and high production of all grades of cotton synthetics and blends. Subsequently, the SG-3D is offered as a double apron changeover for the Gwaltney Shaw frame.

New Appointment

Mr. H. Ibbetson, (secretary, International Wool Secretariat for the past 10 years), has been appointed director of administration for Europe and the U.K. under the I.W.S. reorganisation plans. Joining the Textile Institute, Manchester, as assistant secretary in 1938, he became acting general secretary in 1943 and general secretary two years later. He was appointed secretary of the I.W.S. in 1951.





Figs. 1 and 2. Analysis of sub-division of end-breaks in woollen ring spinning

Modern Ring Spinning of Woollen Yarns*

A discussion of the factors affecting ringframe design and construction, including end-break rates, yarn tension, balloon diameter, maximum spindle speeds, minimum traveller weight, spool spinning, suppressed balloon spinning, power consumption and optimum package size

By F. A. GREENWOOD, B.SC., A.INST.P.,†

CONSIDERABLE efforts have been made at T.M.M. (Research) Ltd. to gain a thorough understanding of the principles underlying ring spinning. New techniques of investigation have resulted in improved techniques for spinning at high speeds. The spinner wishes to produce yarns to a particular specification and this defines (*a*) material, (*b*) count, (*c*) twist and, therefore, yarn strength.

The machine maker must provide ringframes which will enable him to produce these yarns at a maximum rate consistent with minimising (*a*) end break rate, (*b*) labour force, (*c*) cost, (*d*) floor space—factors which are interdependent.

End-Break Rates

If we take a high end-break rate of, say, 10 per 100 spindle hours for 7's Y.S. carpet yarn, this corresponds to a break over 10 miles of yarn, or it means a break in every five bobbins during a spin taking 2 hours. If a finer count yarn is being spun of, say, 20's Y.S., typical corresponding figures are a break every 5 miles of yarn and two breaks every five bobbins during a 4-hour spin.

Breaks occurring behind the front roller, either in or behind the drafting system, are largely breaks which are "built in" the slubbing. As such, the designer of the ringframe has little control on the magnitude except in details such as designing a satisfactory false twister tube and ensuring that rollers are well made and effective yarn grip occurs. The magnitude of the occurrence of these breaks is largely affected by blending and carding.

Those occurring in front of the drafting system can be further sub-divided into "built in" breaks occurring in the slubbing, such as slubs likely to give rise to breaks at the traveller, or breaks which occur immediately at the delivery point of the front rollers. It is these which, in general, determine the permissible level of production of a ringframe.

The analysis of sub-division of end breaks is shown in Figs. 1 and 2. Very large scale testing is required to establish the validity of the form of these end break graphs, but the observations we have made so far certainly support this type of interpretation. The "built in" breaks, i.e. the creel, twister tube and traveller breaks, will be sensibly constant measured as breaks per lb., and are thus approximately linearly related to processing speed. The front roller breaks are very low in magnitude over a range of spindle speeds and rise fairly rapidly when a certain spindle speed, depending on a number of factors, is exceeded.

It is clear that the incidence of breaks at the front roller is affected by the yarn tension and the instantaneous yarn strength. Whilst these two factors can be considered in isolation the position is somewhat complicated by the fact that the yarn strength at the front roller is influenced by the yarn tension.

Yarn Tension

We can associate the behaviour of a yarn spinning balloon with a vibrating stretched string for which the following formula applies:—

$$f\lambda = \sqrt{\frac{T}{m}}$$

where f is the frequency of vibration,
λ the wavelength,
T the string tension, and
m the mass/unit length of the string.

This formula can be illustrated by considering a string instrument, say a violin. The frequency emitted by any string can be doubled (an octave change) by halving the length of the string:—

$$f \propto \frac{1}{\lambda}$$

The frequency is increased as the tension is increased:—

$$f \propto \sqrt{T}$$

The frequency is high when the mass/unit length of the string is small (fine count):—

$$f \propto \frac{1}{\sqrt{m}}$$

* *From a paper given recently to a conference held in the Scottish Woollen Technical College, Galashiels.*

† *T.M.M. (Research) Ltd., Helmshore.*

Interpreting this for a rotating yarn:—

f is proportional to the spindle speed n,

m is proportional to $\frac{1}{N}$ where N is the yarn count;

H approaches $\frac{\lambda}{2}$ when the balloon length is large compared with ring diameter,

thus $nH\ \lambda\sqrt{NT}$ . . . (1)

i.e. $nH = a\sqrt{NT}$

where 'a' is a coefficient which approaches a constant value for long yarn balloons (see Fig. 3).

Since this formula gives the maximum limit to spindle speed or balloon height for given values of count and tension, it is best written:—

$(nH)_{max} = [a\sqrt{NT}]_{max}$ . . (2)

NT is the product of yarn count and tension.

Since $N \propto \frac{1}{\text{cross-section area}}$

the product NT is proportional to stress expressed, say, in lbs./sq. in.

thus, stress $\propto (nH)^2$

and ultimate stress $\propto [(nH)_{max}]^2$

Increasing either n or H by 10% causes a 20% increase in stress.

Doubling either n or H increases stress by a factor of 4. It is clear that, if operating at ultimate stress, the spindle speed can be increased only by reducing H proportionally. This reduction of the balloon height H is the function of control rings.

count and yarn tension has already been derived. In order to apply the formula to calculate maximum speeds, we need to know the maximum permissible spinning tensions.

The ends down influenced by yarn tension occur at the roller nip where the yarn is not fully twisted. The instantaneous strength of the yarn at the roller nip is affected by the staple length and fineness of the fibres being spun, the yarn count and the twist being inserted. These factors also affect the strength of the spun yarn, so it is perhaps not surprising that there is a simple relationship between maximum permissible spinning tension (i.e. tension at the roller nip) and spun yarn strength.

It is convenient to consider the tension at the roller nip when spinning with the longest balloon and on the shoulder of the cop. We have found, for reasonable end-break rates, that the ratio maximum permissible spinning tension when winding on the shoulder of the cop to single thread breaking strength for yarns spun from a wide range of fibres lies between 1:10 to 1:14. Obviously, yarn regularity is a major factor, and the interpretation of "reasonable end-break rate" determines one's choice for this ratio. Using a ratio of 1:14 it is possible to write down formulae giving the maximum spindle speed in terms of spun yarn strength.

In a general form, these formulae can be expressed as:—

NOTE: Woollen yarns generally have Y.B.L. values falling between 150 and 400.

Minimum Traveller Weight

The minimum weight of traveller that can be used is that traveller which is just heavy enough to prevent the yarn balloon collapsing when winding on the largest diameter with the longest balloon, i.e. just on completion of the cop bottom on cop build.

Under these conditions the tension is proportional to the centrifugal force of the traveller,

Therefore $T = fGDn^2$

Where f is a constant

G is the traveller weight

D is the ring dia.

Combining this with the expression $nH = a\sqrt{NT}$, the minimum weight of traveller is given by:—

$$G = \frac{1}{a^2 f} \cdot \frac{H^2}{D} \cdot \frac{1}{N}$$

which, for a particular ringframe reduces to:—

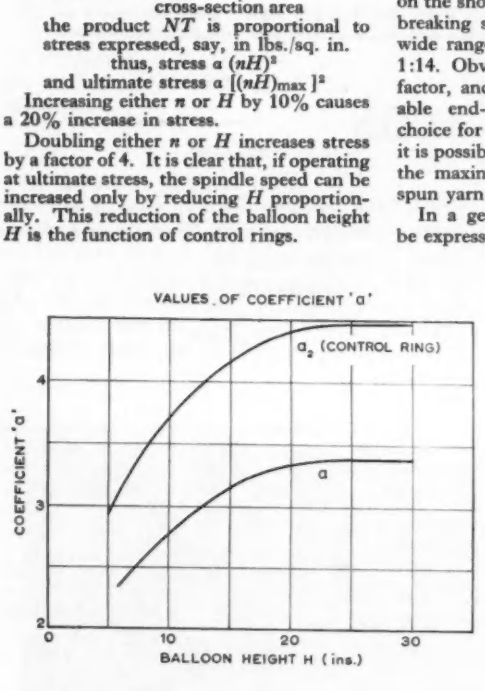
$$G = \frac{\text{constant}}{N}$$

i.e. each frame can be given a "traveller constant" which, if divided by the yarn count, will give the weight of the traveller which will just give balloon collapse, and this constant is independent of spindle speed.

Minimum Twist Spinning

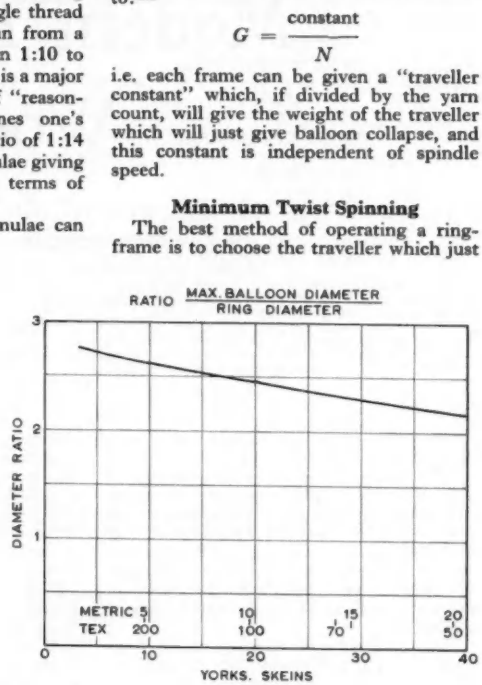
The best method of operating a ringframe is to choose the traveller which just prevents balloon collapse and then increase the spindle speed, so that the end-break rate is at a level dictated by operative work load or yarn quality. To study further the influence of the traveller weight on breaks occurring at the roller nip, it is really necessary to carry out a large-scale study under mill conditions. This is very time consuming, and we have used a method which we call "minimum twist spinning."

The tests are carried out on a single spindle rig similar to a standard ringframe, but on which it is arranged that the speed of the drafting system can be continuously varied so as to vary twist and therefore yarn strength. To evaluate one particular method of spinning, the appropriate conditions are set up and the speed of the drafting system steadily increased, so decreasing t.p.i. until the end breaks. This is repeated to give the accuracy



(left) Fig. 3

(right) Fig. 4



Balloon Diameter

When a yarn balloon rotates it is subject to centrifugal forces acting on the yarn. Air drag also acts on the yarn, and the effects show to greater extent on fine counts. The effect of air drag on the balloon shape is that the plane in which the yarn lies is twisted into a helix causing a reduction in maximum balloon diameter (see Fig. 4). Very coarse yarns may have yarn balloons of diameter up to three times the ring diameter, whereas counts finer than about 85's metric (12's TEX) only slightly exceed ring diameter. Thus, it may be concluded that balloon control rings are required on any ringframe processing woollen yarns.

Maximum Spindle Speeds

An expression for maximum spindle speed in terms of balloon height, yarn

$$nH' = 21{\cdot}4a\sqrt{\frac{L}{M}} \text{ or}$$

$$nH' = 0{\cdot}68\, a\sqrt{NL}$$

where $n = \frac{\text{R.P.M.}}{1000}$

H' = balloon height in cms.

L = single thread breaking load (grms.)

M = yarn count (TEX)

N = yarn count (metric)

For wool ringframes fitted with control rings, spinning in a conventional manner (i.e. with guide eyes) the following formula can be used:—

$$nH = 3{\cdot}8\sqrt{Y.B.L.}$$

where $Y.B.L.$ = Yorkshire Skein × Breaking Load (ozs.)

H = Balloon height (ins.)

required, and the average t.p.i. at break calculated. A spinning technique which at a given speed permits a lower twist yarn to be spun than is possible using a conventional spinning arrangement is considered to be an improved method.

If conventional spinning is examined by this method by observing the effect of changing the traveller weight at a constant spinning speed, then results are obtained which show that spinning at a low tension is not generally desirable. This occurs because the twist held back behind the traveller increases with increased tensions, and this in turn increases the twist. Conversely, if tensions are low the twist tends not to reach the front roller and the yarn breaks more readily.

The guide eye tends to hold back the twist in the yarn balloon. This effect can be reduced by keeping the hole large and positioning the guide eye so that the yarn comes free once every revolution of the balloon. There is, however, another method of improving the situation further.

Spool Spinning

If the guide eye is rotated so as to assist the flow of twist considerable improvements are noted. The same effect can be obtained by using a spool mounted in bearings at the top of the spindle. The spool—simply a specially-designed thread guide—is made of ceramic so that yarn abrasion can be resisted. It is so designed that the yarn is readily threaded and the yarn comes free when the package is doffed. The yarn has to be re-threaded after donning, but the time taken is more than offset by the increased speeds that are possible. Forty per cent. increase in production over conventional spinning methods can be achieved.

Minimum twist tests show that, as the twist is progressively reduced, the ends finally break at the traveller. Sufficient twist has been inserted above the spindle for the yarn to withstand the tensions at this point. The break now occurs at the traveller where tensions are at a maximum.

The formula which applies to a wool spinning frame fitted with spools and control rings is:—

$$nH = 5{\cdot}3\sqrt{Y.B.L.}$$

Suppressed Balloon Spinning

This technique has been attempted for many years and has considerable attractions. Boyd (1909), Freund (1934), Netelenbos, Zoba, T.M.M.(R.) (1952) and recently Pross have patents describing devices or spindle tops for suppressing the balloon. About 1934 Howard and Bullough Ltd., in conjunction with W.I.R.A., made a spiked spindle machine employing a suppressed balloon. It is a successful technique of spinning for condensed slubbings only if yarn strengths are reasonably high, say above 250 Y.B.L. Apparently, spinning is occurring here with a collapsed balloon; this is not so since the traveller must always be heavier than the minimum that can be employed in conventional spinning or spool spinning. If such a traveller is not used the tensions above the spindle are too low for the yarn to feed forward; snarls are formed and bird-nesting occurs.

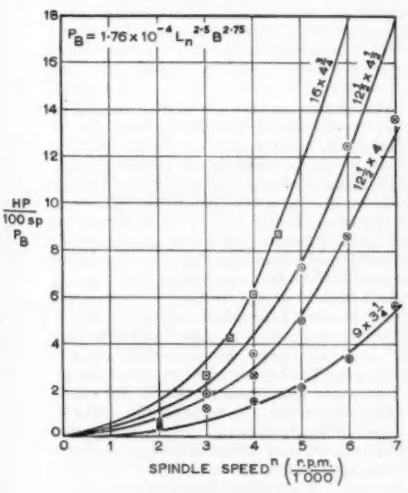


Fig. 5

Power Consumption and Optimum Package Size

There are three major components in the total horse-power required to drive a wool spinning machine:

P_B = the power required to rotate the spindles and packages.

P_P = the power required to process the yarn.

P_A = ancillary power — power to drafting rollers, creel, twister tube, gearing.

The ancillary power P_A is a relatively small component and will not be discussed in detail. Its value expressed in h.p. per 100 spindles is approximately ·7n.

P_B has been measured by means of a swinging field dynamometer at T.M.M.(R.). Its value can vary appreciably with the surface condition of the bobbin. Thus, spindles carrying packages wound with yarns prepared from synthetic fibres require appreciably less power than those wound with coarse, hairy woollen yarns. An average figure is obtained from the following formula:—

$$P_B = 1{\cdot}76 \times 10^{-4} L\, B^{2{\cdot}75} n^{2{\cdot}5}$$

(see Fig. 5)

The power required to process the yarn P_P is the increase in power which occurs when all the ends of the frame are pieced up. Thus, P_P is proportional to the winding yarn tension multiplied by spindle speed. If operating at maximum tensions P_P is related to spindle speed in a linear manner.

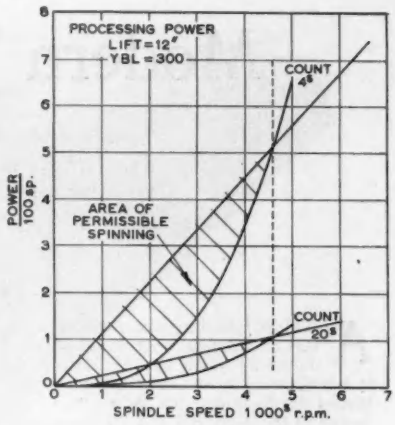


Fig. 6

If operating at minimum tensions P_P is proportional to n^3 since the minimum yarn tension is proportional to n^2. These two curves cross each other at the maximum permissible processing speed (see Fig. 6) and at this speed:—

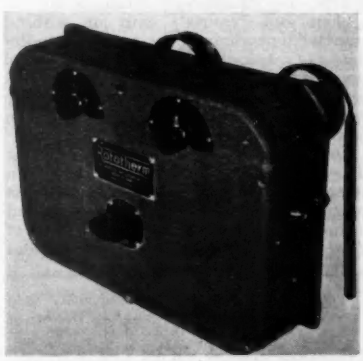
$$P_P = \frac{0{\cdot}016\,(Y.B.L.)^{\frac{3}{2}}\,B}{YH}$$

The total power per 100 spindles is the sum of each of these three components. The great effect of speed and bobbin diameter on total power is seen from the above formulae. The cost of power is a major component in the total cost of spinning wool yarns, and these formulae are therefore important in the calculations of optimum package size.

Dual Zone Temperature Controller

A NEW mercury-in-steel, on-off temperature controller, which has independent circuits allowing control at any two points through one instrument, has been produced by the British Rototherm Co. Ltd., Merton Abbey, London, S.W.19. Each of the two controller circuits consists of alloy steel Bourdon tubes, capillaries and temperature sensitive bulbs, operating mercury switches rated up to 30 amps at 230/250 A.C. The differential is fixed but varies according to switching capacity.

Indicator lamps and bottom entry electrical conduit are standard. Temperature ranges are available between minus 20°F and plus 1,000°F (minimum coverage 100°F) and the equivalant °C.



Modern Woollen Ring Frames*

Constructional details and operating features in Platt Bros. M.W.R.3, 4 and 5 woollen ringframes, also an examination of some of the many considerations affecting selection for a specific range of counts

By L. FIRTH†

ALTHOUGH the earliest model of the B.R.A. woollen ringframe was produced 33 years ago by Platt Bros. it is still being made and supplied. Continued developments led, however, to the design of the M.W.R.1 and 2 frames, with 13 in. lift and rings up to 5½ in. dia. These were first marketed in 1947 and 1950, respectively. Still further developments produced frames with increased package size and increased productivity and our new range—the M.W.R.3, 4 and 5—covers every permutation and combination.

The M.W.R.5

This frame can match the production from one, two, three or even four cards, depending on conditions and can be made up to 70 ft. long over spindles. Separate motor drive makes each side independent of the other so that creeling, doffing, cleaning, etc., can be carried out on one side whilst the other is running. Twelve and 14 in. lift is normally recommended for fine count spinning of, say, 15's Y.W.S. upwards, with ring sizes from 2½ to 4 in., and 16 to 18 in. lift for the heavier trade 2's/20's Y.W.S., with rings 4 to 7 in. dia.

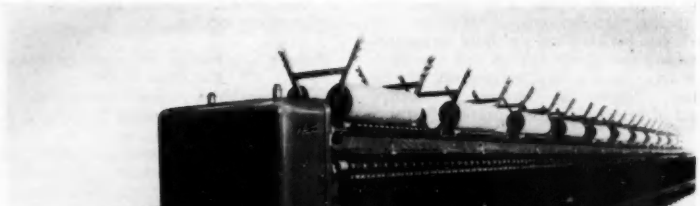
Speeds vary according to the blend being processed. Speed limitations depend on three things—Y.B.L. or yarn strength, power—which increases approximately by the cube of the spindle speed, and traveller velocity. A range of speeds between 2,600 r.p.m. and 7,600 r.p.m. can be obtained, subject to these limitations.

It is estimated that package weights vary between 4 oz. of wool on a 12 in. lift, 2½ in. dia. ring, and 54 oz. on an 18 in. lift × 7 in. dia. ring. A site previously used for a pair of spinning mules is the ideal length for this frame.

Frame Detail

The frame is fitted with (*a*) two-drum creel, (*b*) provision for spare bobbins, (*c*) normal drafting zone with false twisting arrangements, (*d*) three lines of front rollers, (*e*) SpinSaVac arrangement for broken end removal, with or without lappets, depending on the type of spindles used, (*f*) spindles with balloon control rings and separator plates and toe-operated brakes, (*g*) pulley drive to spindles and the type of drive supplied best suited to customer's requirements.

Drive and Headstock.—The main drive is always by two motors, suited to the yarn being spun. The Brown-Voveri is the most expensive drive but is the most flexible and economical from a running cost point of view, and on the majority of blends enables the highest production to be maintained. Designed to give basic variation of speed on the cop bottom and cyclic variation on the chase enables the optimum spinning speeds to be obtained. Other types of motor drive can be supplied, such as Brunt, Heenan and Froude Dynamatic coupling, with basic variator only, manually operated, and squirrel cage motor drive with orthodox V-belt drive. Development work is in hand to provide cyclic variation on the H & F coupling and the Brunt motor.



The M.W.R.5 high speed woollen ringframe covers a wide range—2s to 50s Y.S. Each side is driven independently

All gears and drives are inside the interlocking guards, free from dust and fluff, and all change points are easy to reach.

Creel.—Arranged for double line of drums with hinged bobbin stands and for two lines of condenser bobbins, necessitating the use of traversing creels on the condensers, and particularly so when large rings are used. Bobbins of 15 in. dia. can be accommodated and splay up to 30 in. per bobbin is allowed. The drums are driven by V-belt variator which allows the proper tension to be obtained whilst the machine is running, and dispenses with the gear change hit-and-miss method. Extensive testing has shown that large drums give better frictional grip and 11 in. dia. flanges protect the end cheeses.

Drafting Zone.—Slubbing is fed through two back rollers, a gravity weighted top roller either plain or covered, with nylon pivot ends and a fluted bottom roller. The fluted rollers can be made with continuous flutes, and the back bars holding the top pressure rollers adjustable to take any width or pitch of cheeses on the condenser bobbin. The false twist device is part of the drafting unit, and the type recommended produces a very regular yarn on all counts.

After many tests on all types of tubes we believe that the tube made with orifices of $\frac{3}{16}$ in. and ¼ in. dia. with four agitating pegs on top is the best; the jaws are of the centrifugal type, one fixed and one movable, and the higher the speed the more positive is the grip on the slubbing. This type of twister enables slubbing to be controlled right into the front rollers nip.

The front rollers are the three-roller type for woollen spinning, i.e. two fluted rollers with a front pressure roller suitably covered for the blends to be processed. Each front roller is weighted by spring pressure of a new design. Slight pressure on the unit relieves the pressure from the roller and it remains cradled in position but it can be easily removed for cleaning. The pressure rollers are housed in ball bearings, and all fluted bottom rollers are now made with full-size 1¼ in. dia. bearings.

Twist Reversal.—Change from "S" to "Z" twist is simple. Movement of a hand lever in the headstock reverses the polarity of the motor and the direction of rotation. At the same time, an intermediate wheel ensures that all driving units except the spindles and false twist tubes are run in their proper direction.

Spindles and Rails.—Spool top spindles are fitted as standard but orthodox spindles

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* *From a paper given at a conference held recently in the Scottish Woollen Technical College.*

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can be supplied if required. Occasions arise when front roller or traveller speed and not spindle speed determine the maximum output of the frame. It must, however, be borne in mind that an orthodox spindle and a collapsed balloon spindle require a lappet, whereas spool spinning does not. All three models are now made with stationary spindles and lifting ring rails. It is easier to balance a ring rail than try to balance a spindle rail which increases in weight during the build. The stationary spindle is ideal for spool top spinning; the angle at which the yarn enters the spindle top and the length of slubbing between front roller and spindle top does not vary and tends to produce better yarn.

The self-lubricating rings, which can be supplied in various depths, are housed in individual holders complete with oil reservoir and wicks for instant and adequate lubrication of the travellers. One or two balloon control rings are fitted, depending on lift of ring rail or fitting of spool top. These offer maximum benefit when yarn is being wound on the biggest diameter of the cop, and allow the use of lighter travellers. Full-length separators are used to prevent broken ends contacting adjacent spinning threads.

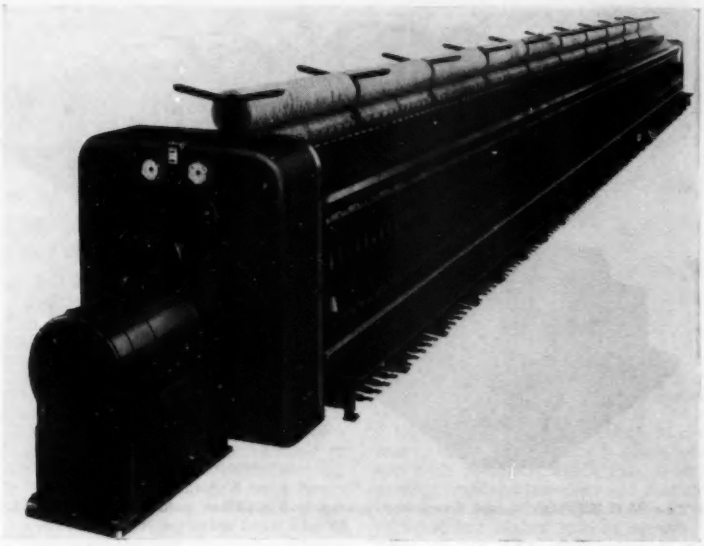
Spindle Drive.—Dependent on lift and ring size, one tape is arranged to drive two or four spindles. Light alloy pulleys have replaced tin rollers and the jockey pulleys are so designed that reversal of spindle direction is easily carried out at the headstock. Two builder motions are fitted. The motion incorporates a cam with a speed change point giving variation enough to cover the building of any diameter of cop. Each revolution of the cam causes the pawl to pick 1/4 teeth, and the size of the cop is determined by the cam speed and the shaper wheel employed.

Automatic Winding-Down.—At the end of a set, a roller moves a dog clutch from right to left and causes the ring rails to lower quickly to a position, allowing doffing without loss of ends, and a micro-switch stops the frame at its correct position. A setting-on shaft runs the full length of the frame and, although easy to operate, cannot accidentally put the frame into motion.

The SpinSaVac unit for picking up broken ends is standard equipment and is fitted at the out-end of the frame. The ends from each side of the machine are kept completely separate so that different colours cannot get mixed. The screen within the unit is capable of being withdrawn for cleaning.

The M.W.R.4 Machine

This fine count frame is made approximately 50 ft. long over spindles, with 10 in. lift for ring diameters of 1¾ to 4 in., and 12 in. lift for 2½ to 4 in. rings. The count range is from 15 Y.W.S. upwards. Single motor drive only is supplied of the Brown-Boveri, Brunt, Heenan and Froude or squirrel cage type. Only one motor allows two types of creel to be fitted; double line of drums for two lines of condenser bobbins, or single line of drums for one line of condenser bobbins. A double line of drums on larger diameter rings will probably need traversing creels fitted to the condensers, but on fine pitch machines standard creels suffice, and condenser bobbins can be spun on both mule and ringframe. If large pitch frames are installed, single condenser bobbins—using alternate ends to each side—should be used; this enables the condenser bobbin to be used in ringframes and mules.



The M.W.R.4 high speed woollen ringframe for fine to medium counts—15s to 40s Y.S. designed to give high speeds, especially when fitted with spool top spindles

The various motions on the M.W.R.5 apply to the M.W.R.4 in most cases, the only differences in the machine being a shorter version for high speed spinning, single motor drive, and hinged separators in place of the fixed type on the long life M.W.R.5 ringframe.

The M.W.R.3 Machine

With single motor drive and maximum number of spindles 156 to 200, with 17 in. lift and rings from 4 to 5½ in. dia., this has been built on similar lines to the M.W.R.1 and 2. Its count range covers approximately 2's to 20's Y.W.S., and the maximum spindle speed with spool top spindles is 2,800 to 5,600 r.p.m., depending on count and quality, and traveller velocity. A single line of surface drums are fitted to accommodate one or two lines of condenser bobbins, dependent on the width of cheeses available from the condensers supplying the slubbing. Conventional spindle or spool top spindles can be supplied and are easily reversible without disturbing the direction of other units in the frame, and the driving arrangement is for one tape to drive two spindles. Where space is limited to about 60 ft., two of these frames can usually be accommodated in the space occupied by the width of a card.

Considerations Affecting Selection

When considering the installation of ringframes, considerable thought should be given to the following points:—

(1) Range of counts. Ring size in relation to count range is important, as this controls the rate and cost of productions.

(2) Depending on count range, it may be policy to provide adaptors and different diameter rings to obtain maximum production.

(3) If some mule spinning is to be retained, to make the plant flexible *gauge of frame and type of creels in ringframes should be designed to accommodate condenser bobbins* suitable for both types of spinning.

(4) If mule spinning is being *entirely replaced by ring frames*, consideration must be given—especially if large rings are fitted—to the adoption of special creels on the condenser.

Traversing Creel with a maximum of 60 in. wide half-drums on a 72 in. wide machine, which is long enough to equip any of our frames, and allowing for splay in the ringframe creel. This length of creel does to some extent restrict passage-ways.

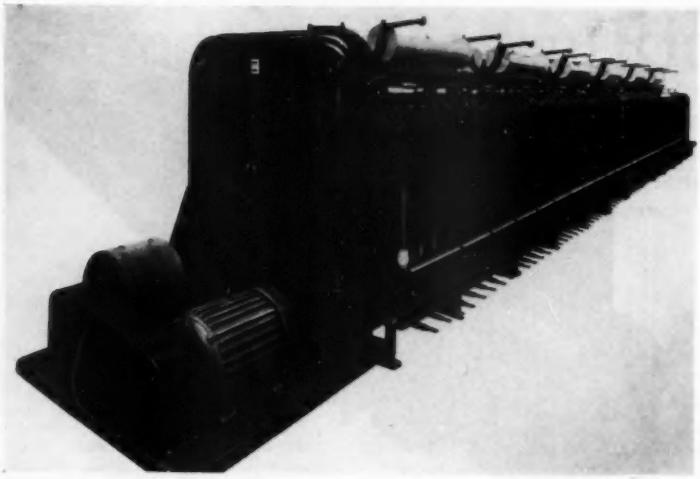
Tandem Creel.—The disadvantage of this type is one of difficulty in doffing front and rear bobbins and necessitating the use of bobbins with 6 in. flanges.

Dual Creel.—Designed to use exactly twice the number of bobbins in a standard condenser, and can be fitted to four- or six-height condensers. The use of double the number of drums with the normal number of threads produces a cheese twice as wide, and adds considerably to the efficiency of both card and ringframe. If mule spinning has to be taken into account, it is possible—on some blends—to run two threads on to one cheese, using only half the number of bobbins, and then run the two threads on to two spindles in the mule. A 6½ in. wide cheese can therefore be used to full efficiency on a 7 in. gauge ringframe, and can also be used in a 2½ or 3 in. gauge mule if two threads are run on to one cheese.

(5) For those requiring large packages of knotless yarn, large rings should be installed but production may be lowered because of the limiting factor of traveller velocity.

(6) Careful analysis of the blend should be made to see if steel or nylon travellers can be used. An increased production might be looked for if the blend can be spun with nylon travellers.

(7) Size of package, i.e. ring diameter and lift, should be carefully examined,



The M.W.R.3 high speed frame for coarse and medium counts—2s to 20s Y.S.

not only from a production and spinning angle but also from the advantages that might arise in after processes. On the other hand, installation of very large packages may well mean providing extra capital for new winding, doubling and twisting machinery or new warping creels.

(8) Again, high production may outweigh the above problems. A 5½ in. ring produces 30% more yarn than a 7 in. dia. ring, providing the yarn strength (Y.B.L.) and traveller velocity allow for higher spinning speeds.

(9) Spool top spindles will, generally, allow up to 40% increased production. There are cases where the Y.B.L. is so low, or the twist so low, that ordinary spindles can deal with the production. However, fitting spool tops or any other H.S. spindle may well reduce the end breaks.

(10) The question of h.p. Longer the frame, longer the lift, and larger the diameter of the cop, and greater is the h.p. Those intending using spinning regulation can, as yet, only purchase frames with motors up to 25 h.p. (M.W.R.5—Two 25 h.p.) motors. Higher h.p. can be supplied where spinning regulation is not required but care should be taken not to go too far, because a point can be reached where the h.p. demanded becomes uneconomical and the cost of yarn production is out of all proportion to the number of spindles and size of packages installed. Of course, Heenan and Froude and Brunt motors with cyclic variations remove this limitation of 25 h.p.

(11) The installation of large package frames, coupled with traversing creels may have advantages. Operatives can mind more spindles because of longer runs. Traversing creels supplying longer cheeses means less creeling time, and on the M.W.R.5 frame operatives from the running side can help creel and doff the other side.

(12) When determining the number of spindles thought should be given to the type of cards installed. If they are on maximum production, or if low production is evident owing to bad card clothing, slack rubbers and tapes, then due allowance should be made for higher production when the faults are remedied and if, at some future date, ordinary open type sets are to be converted to semi-Continental types with an increase in production.

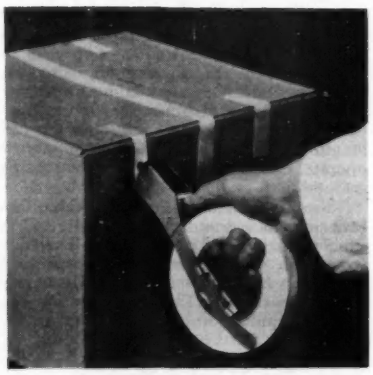
The question of which type of frame to install will always depend on circumstances. The M.W.R.5 fine frame will spin the same yarn as the M.W.R.4. The M.W.R.5 coarse frame will spin the same yarn as the M.W.R.3, but I imagine that where space is available the M.W.R.5 would be installed, and M.W.R.3 or 4 where shortage of space demands the installation of short frames. Of course, from the capital investment point of view, a single motor drive frame will always be cheaper than individual drive to each side. Those processing blends of different colours may object to spinning two colours on the double-sided M.W.R.5 and it would, of course, be preferable to install M.W.R.3 or 4 and keep one colour to one frame. It is also advantageous to creel one set of bobbins large enough to spin a full set of cops. The piecings can then be run off to waste in the next process.

Other problems directly concerned with the internal management of the mill include: (*a*) awaiting condenser bobbins, (*b*) labour force available for doffing and cleaning and (*c*) skill of the operatives and the number of trainees to be employed.

Hand Dispenser for Tape

AN improved hand dispenser (Model HDA) being marketed by P. P. Payne and Sons Ltd., Haydn Road, Nottingham, is the "pull and tear" variety, and it is so small and compact that it can be carried easily on the job by the packer. The construction provides the packer with an excellent grip, and simplifies the application of pressure sensitive tapes, ensuring perfect control during the sealing operation. A special feature is the easily replaceable cutter blade which, for safety reasons, has been designed to cut tough strapping tapes, without being razor sharp.

Though it can be used with all pressure sensitive tapes on 3 in. centre cores from ¼ to 1 in. wide, and up to 8 in. dia. rolls, it is the ideal partner for dispensing the company's "Superseal" strapping tape, manufactured from high tenacity rayon threads bonded together to form a weftless tape, backed with a high tack latex adhesive. It is intended for heavy-duty packaging where its high breaking strength can be used to advantage.



New "Grip-a-Tab" hand dispenser can be used with tapes on 3 in. centre cores from ¼ to 1 in. wide and up to ¼ in. dia.

New Appointment

Associated Electrical Industries Ltd. has appointed a Director of Research. He is Mr. L. J. Davies, who was Director of Research of A.E.I. (Rugby) Ltd. This appointment is aimed at ensuring a coherent research effort by the company and making the most effective use of the resources and scientific ability in its various laboratories. Mr. Davies becomes responsible for the direct supervision of the four A.E.I. Research establishments at Aldermaston, Harlow, Manchester and Rugby.

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Prices for Australian Wool

Australia's National Council of Wool-Selling Brokers is reported to be confident that Australian wool prices will be higher in the new selling season and that overseas competition will be stronger. Last year Australia's wool cheque totalled £A314 million.

The Search for Higher Speeds*

A discussion of some of the problems encountered with increasing speeds, also a review of recent developments on rings and travellers including ear and "C"-shaped types, nylon specialities and porous sintered metal rings

By L. G. FORBES†

MUCH of the evidence on which we evaluate travellers must come from the user and it is to the user that we look for evidence of any limit, in practice, to the speed at which travellers can be run. We have obtained well documented evidence of "C"-shaped travellers running on unlubricated spinning rings at speeds greater than 40 metres/sec. (say 10,000 r.p.m. on a 76 mm. dia. ring). Similarly it can be shown that ear-shaped travellers on lubricated doubling rings are being run commercially at speeds greater than 54 metres/sec.

Of course, only a small percentage of mills achieve such speeds. The large majority must be content with something less and, in asking themselves why, the most obvious explanation that comes to mind is the limit apparently imposed by the rings and travellers. This is because trouble will first show itself in the region of ring and traveller.

Consider end breakages. These most often occur between delivery rollers and bobbin; the area where the ring and traveller operates. At a Textile Institute conference in 1947 a list of 43 causes of end breaks was given and of these, only 10 made any reference at all to the ring and traveller. Eliminating cases in which the ring or traveller was only mentioned in reference to some other factor such as spindles, traveller clearers or over full cops, we are left with only 5 cases out of 43 in which rings and travellers are a direct cause of end breaks.

In seeking to achieve higher speeds it is common for mills simply to increase speed until the point is reached beyond which the end breakages rate would exceed an acceptable figure—and then give up. At this point the search has only begun. Eliminate the cause or causes of breakages and the speed can be increased again. A fundamental factor limiting spindle speeds is yarn strength. It has been found experimentally that it is not possible to spin cotton with a tension exceeding 1/14th of the single thread breaking load of the yarn.

Another point at which the search for higher speeds will very often come to a full stop is when the travellers start to burn, as indicated by discolouration of the parts of the travellers which come into contact with the ring. Provided working conditions are similar, this stage is reached much sooner with a "C"-shaped spinning traveller than with the ear-shaped traveller running on a lubricated ring. Here again traveller burning is not necessarily an ultimate barrier and can often be cured. The advice of a reputable traveller maker is invaluable in overcoming problems of traveller burning.

In the case of "C"-shaped travellers a solution may lie in using a different shape of traveller or a traveller made from wire of a different cross-section. More recently we have introduced travellers with various surface treatments which have proved successful in pushing back the heat barrier.

The burning of ear-shaped travellers on lubricated rings presents a more complicated problem because several different portions of the traveller may be effected. A solution to the problem in this case will depend upon which parts of the traveller are affected, but the very fact that there may be several different causes opens up a wider range of possibilities for effecting a cure. Fundamentally, the burning of travellers on a lubricated ring is the result of a breakdown in lubrication, resulting in overheating of that part of the traveller which has been affected. To overcome this problem we must either improve the lubrication or relieve the bearing pressure in the area where the traveller is becoming overheated. There is more than one way of doing either of these things but to discuss this subject fully would require a paper on its own.

Wear Pattern

It is appropriate to mention here the extent of the useful information which can be obtained from a close examination of the wear pattern on a used traveller. To quote only the most common example of this, excessive wear at the foot of a traveller indicates that it is too heavy and is therefore producing excessive tension in the yarn. The point I want to emphasise is that, in many cases, there are quite simple ways of overcoming apparent barriers to higher speeds presented by rings and travellers.

I feel that the whole conception of rings and travellers in relation to higher speeds is put into better perspective if we regard the traveller as running under conditions which restrict its speed to a point well below its potential. This point is well illustrated by the fact that the traveller, in addition to performing its basic function of providing winding-on tension in the yarn, has also to provide additional tension in order to control the balloon. If the traveller can be relieved of this necessity to control the balloon, then its weight need not be so great and it can be run at higher speeds. This is clearly illustrated on frames fitted with balloon control rings and on some modern frames which make use of balloonless spinning techniques.

So far, I have tried to outline, in general terms, the way in which users should approach problems which may arise concerning rings and travellers and particularly those problems which seem to be a barrier to achieving higher spindle speeds. But what of the ring and traveller manufacturer? What contribution is he making to the search for higher speeds?

Research into the design of ring travellers is concerned basically with questions of friction and heat dissipation. If we can reduce the pressure between the ring and traveller or spread the load over a wider area this will allow the traveller to run faster without overheating. It was considerations such as these which led to the design of the anti-wedge ring patented by T.M.M. Research Ltd. The principal feature of anti-wedge rings is the curvature of the inside of the flange which has been designed to match exactly the curvature of the inside leg of an elliptical spinning traveller. This results in a greater area of contact between ring and traveller thus reducing the load per unit area on the bearing and allowing the traveller to run faster. That this theory has proved itself in practice is shown by the vast quantities of anti-wedge rings sold to cotton spinners. There is no doubt that, given suitable conditions, traveller speeds of more than 33 metres/sec. can be achieved on anti-wedge rings with elliptical travellers.

It must be emphasised, however, that the anti-wedge ring was designed specifically for the high speed spinning of fine cotton counts. It will not give advantage to every mill and several years' experience with these rings has taught us the limits beyond which we would not expect anti-wedge rings to give better results than the conventional spinning ring. Briefly, we would not expect anti-wedge rings to be better than the conventional spinning rings unless run at a traveller speed of more than 23 mps. and unless the cotton counts are finer than 34s metric. I do not mean that anti-wedge rings cannot be used except under the conditions specified in the notes, only that they will not necessarily be better than a conventional ring under such conditions.

The traveller maker has contributed to the range of usefulness of the anti-wedge ring by designing two special styles of traveller for use with it. These styles are known as clip and spiv and, like the elliptical traveller, they conform to the curve of the inside flange of the anti-wedge ring. In addition, they offer greater clear-

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* *From a paper given recently to a meeting of cotton mill managers in Manresa, Spain.*

† *Eadie Bros. and Co. Ltd.*

ance for the passage of the yarn between the traveller and the ring.

In providing for greater yarn clearance in the spiv and clip styles we had to raise the centre of gravity of these travellers in relation to the elliptical style. A high centre of gravity is an undesirable feature in a high speed spinning traveller so that our first preference is for the elliptical traveller on anti-wedge rings. We would only recommend clip or spiv travellers, in that order, if difficulty is experienced with the elliptical style in any particular case. I should add, that clip and spiv styles are made for one flange rings only. It was found that, for two flange rings the elliptical traveller already provided as much yarn clearance as necessary.

To improve the heat dissipation qualities of high speed spinning travellers we have experimented with several wire sections, apart from the conventional round and flat wire. The theory is that a flatter and thinner section of wire will conduct heat away from the bearing area more quickly due to air cooling. As a result of these experiments we are now manufacturing several styles of spinning traveller in a wire section described as half round, wide. Such travellers are identified by the letters H.R.W. The wire from which these travellers are made is rounded on the inside. This provides a smoother passage for the yarn and also gives a better bearing between ring and traveller.

In addition to improving the geometry of the travellers we are also studying the effects of plating steel travellers with such substances as chromium and nickel. A surface treatment with molybdenum disulphide is also giving encouraging results. Mills which have done full scale trials with these experimental travellers report that both nickel plated and molybdenum disulphide treated travellers can be run faster, and that they last appreciably longer than conventional travellers.

Developments mentioned so far have been concerned principally with the flanged ring and "C"-shaped traveller for cotton spinning and it is encouraging to be able to report progress in a field which has changed little since the principle of spinning with rings and travellers was first invented. This lack of progress is possibly due to the fact that nobody has yet succeeded in perfecting a lubricated ring for cotton spinning.

Doubling and Twisting

The doubling or twisting section of the industry presents a very different picture. Here the Eadie self-lubricating ring will be familiar to all, as will the multiple groove grease lubricated doubling ring. These rings have opened up wide fields for the increase of spindle speeds and textile mills throughout the world have taken full advantage of them.

The introduction of nylon doubling travellers has permitted a further significant increase in traveller speeds. Nylon travellers are useful for wide variety of yarns but they have not been found successful for woollen and worsted fibres. These yarns cut the nylon so quickly that the travellers are quite uneconomical for general use in this field. We are not content to let matters rest there, of course, and are working now on the design of a nylon traveller more suitable for animal fibres. Nylon travellers are already fully established for the production of sewing threads and for the twisting of rayon and nylon tyre cords. They are also being widely used for the doubling of cotton yarns, particularly for the heavier counts.

Nylon has its limitations as a material from which to make travellers. If, for any given depth of ring, we make nylon travellers heavier than a certain weight, then the bulk of the traveller restricts the amount of yarn which can be wound on to the bobbin. Similarly, at the lighter end of the scale the nylon travellers become so flexible they will not stay on the ring. To give equal tension the nylon traveller must be only 2/5th of the weight of its metal counterpart. This fact has resulted in the sales of nylon travellers being concentrated on the lighter and more flexible sizes for any given ring depth. In many cases it has been found necessary to adopt a shallower depth of ring and so use a shorter stiffer nylon traveller of the required weight. This has led to a definite trend towards adopting shallower rings by users of nylon travellers.

It has not been found possible to make nylon travellers to replace "C"-shaped travellers for cotton spinning. This is because the majority of travellers used for this work are so fine that their counterparts in nylon simply would not stay on the ring. It is true that nylon spinning travellers have been made and are available, but these are produced exclusively for the flax spinning trade where the sizes called for are much heavier than is common in cotton spinning.

First experiments, done some years ago, with nylon rings were unsuccessful. This subject has been reopened recently and small quantities of nylon rings are being evaluated for us at the moment. It is expected that the life of a nylon ring will be very short, compared to that of a steel ring but if we can produce them cheaply enough they may become an economical proposition for certain applications. The advantages of a nylon ring are that it will presumably require much less lubrication than a steel ring. In addition, as it becomes worn, will not liberate the metallic particles which can be so troublesome in producing stained yarn. Similarly we would expect much less wear on metal travellers running on a nylon ring. From all this it is reasonable to assume that a nylon ring will be appreciably cleaner in operation than a metal one. We also hope that nylon rings will permit higher traveller speeds.

Anything which reduces ring traveller wear is an advantage, of course, but it is more important for some mills than for others. In spinning continuous filament synthetic yarns for example, the life of the travellers can very often limit the weight of yarn which can be wound on to the bobbin. Traveller wear in synthetic yarn spinning presents two distinct problems. One, the large diameter shallow depth rings used in the continuous filament industry traveller speeds are high; 45 m.p.s. is not uncommon. At these speeds traveller wear produced by friction against the rings can be very severe. This is an application for which nylon rings might prove valuable. We have also produced travellers made from a special wire and these have proved helpful. Such travellers are identified by the suffix AR 13.

The other problem is presented by filament yarns containing a small percentage of titanium dioxide. These are the so-called matt- and semi-matt yarns. This titanium dioxide is very abrasive and yarns containing it are found to cut through the heads of the travellers very quickly. To overcome this we produced chromium plated travellers. These were very successful but, the plating being so hard, the travellers wore out the rings much too quickly.

This is interesting because it illustrates the relationship there must be between the hardness of a ring and the hardness of a traveller. It does not follow that a harder traveller is necessarily a better one and the same may be said of a ring. There is an optimum hardness for both ring and traveller and if this is varied for either member of the combination then the disadvantages are likely to outweigh the advantages obtained.

But to get back to the problem of the cutting effect of the matt yarns, chromium plating seemed to be the answer but we had to overcome the excessive ring wear. We succeeded in doing this by plating only the heads of the travellers, leaving that part which came into contact with the rings unplated. The result is a chromium plated head, or C.P.H. traveller. The handling and processing required in the production of C.P.H. travellers makes them expensive but the fact that they may last eight or even twelve times as long as a standard metal traveller when used with matt synthetic yarns, makes them eagerly sought after by mills on this class of work.

Porous Metal

Another development is the doubling ring made from porous sintered metal. This type was developed to meet the requirements of mills having serious difficulty due to oil staining of the yarns. Made from a porous metal these rings can be impregnated with oil. In this way, we are able to take advantage of a lubricated ring which requires no external oil supply. This eliminates a very common source of oil stains on the yarn. In practice the traveller running round the sintered metal ring will draw off only sufficient oil to meet its immediate requirements.

Surprisingly little oil is used up in this way and we have found that sintered metal rings can be used for up to two years before requiring re-impregnation. The absence of a free oil associated with these rings makes them very clean to operate and this is of particular value to spinners of synthetic yarns on the worsted system. Sintered metal rings are also becoming increasingly popular for doubling cotton, particularly poplin yarns, and for spinning and twisting white and pastel shades of worsted yarns.

These rings were designed to reduce stained yarn and no other particular advantage is claimed for them. In fact, we would not expect the life of a sintered metal ring to be as long as that of a conventional steel ring and care must be taken when putting on and removing travellers as there is a danger of damaging sintered metal rings, particularly with the heavier sizes of traveller.

A ring and traveller combination which seems to offer exciting possibilities for the future is the sintered metal ring with a nylon traveller. Several advantages are immediately apparent, in that there would be no danger of damaging the P.S.M. ring when putting on or taking off a nylon traveller. Similarly heavier sizes of traveller could be used. Then again nylon travellers require much less lubrication than metal ones and P.S.M. rings were designed to provide minimum lubrication.

It is rather a mystery to me why this combination of sintered metal ring with nylon travellers has not been more widely used. There was some fear, several years ago, that the soft nylon might tend to block

up the pores of a sintered metal ring. On the basis of the trials done so far this fear seems groundless. I know of one cotton mill in Denmark which has used sintered rings with nylon travellers on a large scale for at least six years and is very pleased with them. There are also two sizeable installations in Britain, one spinning rayon tyre cord and the other doubling nylon yarn.

My view is that constant wiping of lack of interest in this combination is that mills have simply not had time to catch up with the work done by the ring and traveller makers in this field. For anyone wishing to by-pass some current trends and step right into the future I would strongly recommend trying nylon travellers running on porous sintered metal rings—provided the work in question is suitable.

If high traveller speeds are to be achieved, and maintained, it is most important that the rings be properly run-in during the initial stages of their life. Rings are supplied in a polished state but no matter how well we polish them mechanically the traveller will still impart its own super polish to the bearing surface. During this process minute particles of metal dust and debris are liberated and if these particles are allowed to remain on the bearing surfaces their effect will be most harmful. This process may continue for some weeks and it is most important that the rings should be kept scrupulously clean during this period. Frequent traveller changes are also important when new rings are being run-in.

My own view is that constant wiping of the rings with a lightly oiled cloth and changing the travellers as often as is possible during the first weeks of a ring's life are more important than reducing spindle speeds and using lighter travellers as recommended by many authorities. I agree that it is beneficial to reduce speed but I question the desirability of using a traveller of different weight from that which would normally be used for the counts of yarn in question.

Fluorescent Tubes for Colour Matching

IN lighting for the colour matching of textiles and other coloured products there was no doubt of the principal requirement. It was to give the closest possible simulation of daylight, usually north-sky light. The technical requirements were: (*a*) spectral quality similar to north-sky daylight throughout the visible spectrum, and also in the near ultra-violet if fluorescent white patterns were to be viewed and (*b*) lighting of a suitable area, e.g. a viewing cabinet, at an intensity of at least 50 lumens/sq. ft., said Mr. W. Harrison, B.Sc., in a recent lecture at the sixteenth annual Electronics' Exhibition in Manchester.

It was a formidable requirement to provide a source giving a quality acceptable to the colourist and hitherto fluorescent lighting alone had not been able to satisfy. The most successful lighting for non-fluorescent colours had probably been that provided by the combination of light blue fluorescent tubes with incandescent lamps, as in the Siemens' colour matching unit. Another approach, said Mr. Harrison, was with the Xenon lamp which had a large ultra-violet content, but this was an expensive specialised lamp. If fluorescent tube lighting alone could meet the requirements it would obviously have great advantages of simplicity, convenience and economy. Such lighting had a wide potential application, e.g. in the lighting of shops where fabrics are sold.

In designing a lamp for colour matching work Mr. Harrison found that the calcium silicate phosphor which had its main emission band in the orange region of the spectrum also had a second emission band in the near ultra-violet. This band was favourably placed for the excitation of the whitening agents and a tube with the calcium silicate phosphor could be useful for the examination and grading of fluorescent white patterns. Some, but not all, de luxe warm white tubes employed calcium silicate phosphor.

The next step in the design of the colour matching tube was to combine the calcium silicate phosphor with a complementary light blue phosphor in a single tube. This was the basis of the fluorescent tubes which were now to be marketed in the 4 ft, 40 watt and 2 ft. 40 watt sizes. The 4 ft. tube had an average light output of 1,600 lumens and the corresponding light output for the 2 ft. tube was 960 lumens. The overall colour of the light (the chromaticity of the tube) was similar to that of north-sky light at 6,500°K, and the spectral distribution expressed in the agreed eight C.I.E. wavebands was shown in Table 1.

The miniature fluorescent tubes had a number of advantages:—

(1) No filters or lenses were needed over the light source. The incident light on the pattern was largely diffuse, which reduced the effect of surface structure on the readings.

(2) The low wattage dissipating of 6 watts gave negligible temperature rise in the measuring head, with consequent improved stability of the photocell.

(3) The fluorescent tube had a life of at least 1,000 hours.

Colour measurements could be made using four of the filters in the wheel. These were designated R - orange, G - green, B1 - blue, and B2 - light blue. Readings might be expressed as R.G.B. readings or by a simple conversion taken to C.I.E. co-ordinates. It had been found that the ultra-violet output from the colour matching tube was adequate to give the equivalent of measurement under daylight conditions with full u-v content. As an example the measurement of a highly fluorescent white card gave co-ordinates x - ·298, y - ·299 and z - ·403, which agreed well with the values obtained on another type of instrument.

Table 1. Spectral Distribution in 8 Wavebands, as % of Light Output

Band No.	1 Far Violet	2 Violet	3 Blue	4 Blue-green	5 Green	6 Yellow	7 Red	8 Deep Red
Tube ..	·025	·52	·66	9·6	44·4	35·4	9·0	·40
Daylight 6500°K	·03	·24	·82	10·7	41·8	35·9	9·8	·70

The ultra-violet output as measured through a Chance O.X.1 filter was approximately 60% of that in daylight.

Regarding viewing tests, a number of patterns had been compared under the tubes and in daylight. The indications were that the new tubes were very close to true daylight in their colour rendering, with slight differences from daylight attributable to the differences in Bands 2 and 8. Fluorescent patterns could probably be satisfactorily graded, although it might be worth while to have a separate de luxe warm white tube for this purpose. Generally, the colour matching tubes should provide a satisfactory substitute for daylight whenever the latter was not available or was inadequate.

The 6 watt 9 in. fluorescent tube was one of the miniature tubes now available. A new colorimeter (patent applied for) had been designed around two of these tubes, one of the colour matching type similar in colour to the tubes described above and the second an ultra-violet tube for fluorescence measurements. This new fluorescence measuring unit had three parts: (*a*) power pack, (*b*) measuring head and (*c*) galvanometer. The measuring head contained the two tubes together with a filter wheel with six filters and a "potted" barrier-layer type photocell. The measuring head could be placed in any position, e.g. with the aperture down on a sheet of material.

When the instrument was used as a fluorimeter the ultra-violet tube gave a relatively large output and allowed sensitive measurement to be made of the fluorescence of patterns. Table 2 was an example of the measurement of the white card. The filter No. 1 which was an O.X. 1 black glass, measured the u-v reflectance of a magnesium carbonate block in setting the output of the tube to a reading of 100.

Table 2

Filter ..	1	R	G	B1	B2
Mag. Carbonate	100	-	-	-	-
White Card	16	7	34·5	60	88·5

The filter B2 would be used if a single figure measurement of fluorescence were required.

Glass Fibres and Fabrics

Courtaulds Ltd. and United Merchants and Manufacturers Inc., of New York, announce a joint venture for the manufacture and marketing in the U.K. of glass fibres and fabrics for industrial and decorative purposes.

TEXTILE MACHINERY and MILL EQUIPMENT NEWS

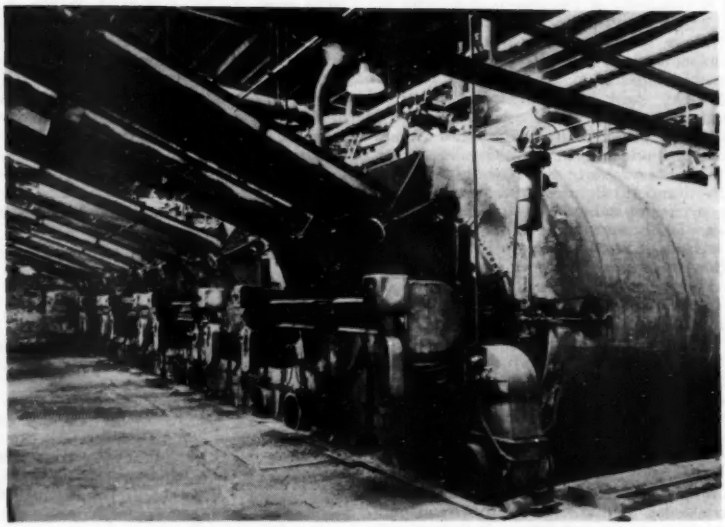
High Efficiency Steam Generation Based on Coal

Details of a high efficiency unit which completely copes with heavy load fluctuations, also producing steam and power at low cost and completely smokeless

WELL-KNOWN as one of the largest suppliers of interior carpets, upholstery material and other products such as draught excluders to the British car and public transport industry, T. F. Firth and Sons Ltd. are also one of the foremost domestic carpet manufacturers although this side of the business is not carried out at Flush Mills, Heckmondwike, which is the subject of this brief article.

The company is an interesting example of a vertical organisation which is conducive to high manufacturing efficiency and economy, and also enables constant supervision to be maintained throughout all stages of production. The raw wool is brought in and subjected to the normal processes of scouring, carding and spinning. Scouring tanks account for a considerable proportion of the steam load and are partly responsible for most of the peaks. Dyeing is carried out in hank, piece and loose stock vats and the steam injected dyeing vats and heated ovens for drying the dyed materials are also heavy steam users.

Owing to a considerable expansion programme which, of course, has run parallel to the increased output in the motor vehicle and furnishing business steam demands rose, outstripping the capacity of the existing boilers. The plant, which has now been replaced, comprised five 30 ft. × 9 ft. Lancashire boilers fitted with sprinkler stokers, and burned 200 tons of singles each week. Sufficient time has now elapsed to evaluate the economies of the new boilers and associated equipment which were installed into the old boiler house.



Overall view of the boiler installation in T. F. Firth and Sons Ltd.

The five new boilers, supplied by Daniel Adamson and Co. Ltd., are their super Lancashire design, each 20 ft. long and 10 ft. dia. and have a maximum capacity of 12,500 lbs. steam per hour. The fuel, which is now ½ in. washed smalls and nearly £1 per ton cheaper than the singles which had to be burned on the old sprinklers, is mechanically conveyed into the main combustion flues by means of Danks "Oldbury" chain-grate stokers. The floor of the boiler-house is considerably lower than ground level and the fuel is dumped by lorry into receiving bunkers from which it flows down inclined wire-reinforced open top chutes into the hoppers fitted on the stokers at the front of the boilers. These glass chutes, devised and fitted by the engineering staff of T. F. Firth and Sons, are set at an angle of 21° from the horizontal; it was, in fact, found by experiment that the coal would slide at an angle of 17° but the extra 4° was added to cater for variations in moisture content.

There is thus no manual or even mechanical handling of the fuel before it reaches the chain grates. The super Lancashires are not standard units in this instance since the banks of air

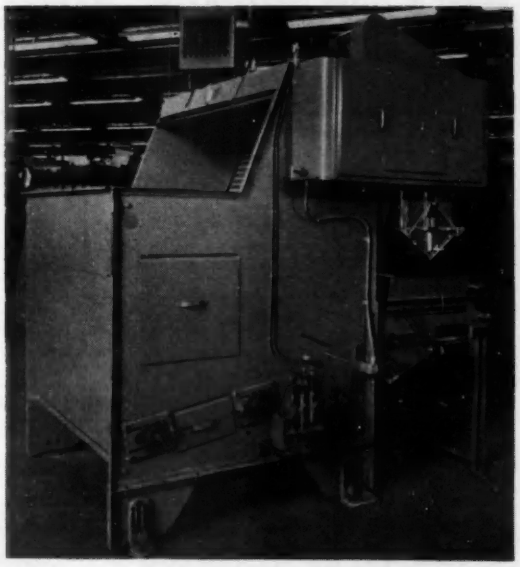
pre-heating tubes down each side are omitted and a single common economiser serves all five boilers. Boiler feed water at an average temperature of 150°F. is supplied through one of the two Weir steam pumps and comprises nearly 95% condensate returns and townswater make-up. All condensate returns by gravity to a common storage tank which holds 40,000 galls. (approximating to one hour's running of the boilers) and is situated in the boiler house. This tank and also the tank where water treatment, subject to a daily check, is carried out were fabricated by the company engineers in wood which is not only corrosion resistant but is also an efficient insulant by itself.

All the electricity requirements of the mill are met by a Metrovick 1,250 kW pass-out turbine, while a Brush 1,000 kW unit is in position as a standby. The turbine receives steam at the boiler operating pressure of 160 p.s.i. super-heated to 620°F., and passes out at 30 p.s.i. at about 300°F. Fortunately the operations in the factory are such that the peak demand for steam coincides with the peak demand for power. A Lea water recorder is fitted in the feed line to the boilers and a very satisfactory figure of 8·5 lb. steam is achieved for every pound of coal burned.

As befits a company engaged in such a competitive field careful checks are kept on all costs and in the boiler-house the steam costs total an average of 7*s.* per 1,000 lb. of steam covering all labour, amortisation, fuel and maintenance. The boilers operate on a 24-hour basis and a two shift system with four boilers working during daytime and normally two at night. Two men are on duty in the boiler-house day and night and although it is not necessary for both of them to be present from the point of view of work to be done it is deemed preferable in case of sudden illness or some other unexpected incident.

The total cost of the new boilers and associated plant was around £75,000 and savings due to reduced labour charges, a cheaper grade of coal and in spite of this a smaller quantity of fuel (180 tons as against 200 tons weekly) amount to £200 per week. It must also be remembered that the size of the mill and associated equipment has increased by 40% since the new boiler plant was installed. The whole plant constitutes a highly efficient steam generating unit which completely copes with heavy load fluctuations and produces steam and power at low cost and completely smokelessly using fuel produced locally. Fuel handling and boiler controls ensure that labour requirements are reduced to a minimum while the cleanliness of operation compares favourably with any other fuel.

Weighing Feed Performance Improved by Conversion Kits



Hunter 600AH feed with spray pump

TWO new conversion kits designed to improve the performance and reduce the stoppages of all types of weighing feeds are announced by James Hunter Inc., Mauldin, S.C., U.S.A. One, known as the aluminium weigh arm and ball bearing suspension unit and damper control, replaces the entire weigh arm and spring steel suspension strips previously furnished with Hunter feeds. Its weighing accuracy remains the same, while eliminating all small disc counterweights. The scale is graduated from 8 to 32 ozs. Hunter's new unit is said to completely eliminate the stoppages previously experienced from broken suspension strips, since its bearings are extremely rigid and will withstand greater service.

The other unit is the company's weigh pan air cylinder conversion kit. It can be used to replace rotary electrical solenoids and the old style air cylinder that required a spring for returning the doors to the normal closed position. All necessary parts, such as pressure regulator, gauge, fittings, air solenoid, air cylinder, and mounting brackets are furnished, along with a set of installation blueprints. The new air cylinder is reported to be superior to the rotary solenoid and old style air cylinder previously used, and offers less maintenance. Both conversion kits are available immediately.

Ambler's Increase Productivity

The Jeremiah Ambler Group of mohair and fine worsted spinners have decided to double the present size of the plant in the new factory at Ballyclare, Northern Ireland. This factory is almost complete and further machinery now ordered will go into production at the end of this year alongside units already running three shifts. It is intended at the Ballyclare factory to produce many various types of synthetic yarns, and their factory at Carrickfergus continues to run three shifts as well as the other new factory at Peterlee, Co. Durham.

New Auto-Strapping Development

Automatic strapping of cartons by the new "Pakseal" development

A NEW development in the field of automatic strapping is claimed to solve a serious carton-security problem for manufacturers in many industries. This development is a special version of the "Pakseal" Auto-Band Strapper manufactured by Package Sealing Co. Ltd., 44 Uxbridge Road, London, W.5. It is designed to ensure that the steel-band strapping around cartons fully retains its tension during transit—irrespective of the handling to which the carton may be subject—and while it is being stored. C. and J. Clark Ltd., shoe manufacturer, presented Package Sealing Co. with the task of overcoming this problem of tension-maintenance. For their home markets, the boxes in which Clark's pack each pair of footwear are, in turn, packed in large outer cartons. As with numerous other types of product, the nature of footwear is such that after packing, a good deal of air is retained in the carton. At first, this internal air pressure keeps the container rigid, but after strapping and sealing, when the carton is being handled or stored, leakage of the air results in the loss of this rigidity, with a consequent slackening of the steel bands.

Generally speaking, automatic strapping machines incorporate a controlled tension stroke that "tensions-up" the band by approximately 2 in. This is entirely suitable for strapping of hard packages and for packages whose contents enable them to maintain their rigidity. To deal with Clark's problem, however, it was seen that a longer stroke—one of at least 4 or 5 in.—would be needed. The task then was to provide the longer tensioning stroke and the necessary additional power. This has been done successfully and two of the new-style "Pakseal" Auto-Band Strapping machines are now strapping and sealing the entire output of Clark's twenty U.K. and two Eire factories—that is, 207,000 pairs of shoes of all types each week. Between them they are double-strapping sixteen cases/min. "Pakseal" Auto-Band Strappers are fitted with a "ring" through which the cartons pass. Those installed at the Clark works each have a ring that takes any packages up to a maximum of 27 in. × 27 in. without any adjustment to the machine. A special galvanised-strip seal, which secures the straps around the package, is entirely formed, cut and applied to the package within the machine, and is of a type that can be made only by "Pakseal" Auto-Band Strappers.

Automatic Hydraulic Extractor

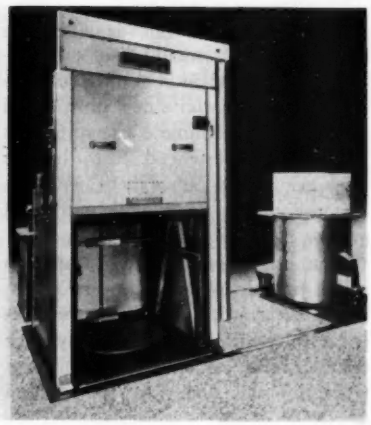
AN agreement with Strike's Laundry Machinery, Los Angeles, California, gives Watson, Laidlaw and Co. Ltd., 98 Laidlaw Street, Glasgow, C.5, sole manufacturing rights, and world wide distribution concessions, excluding only the U.S.A. and Canada, for the Strike automatic hydraulic extractor. The combined knowledge and experience which this brings to questions relating to the rapid and efficient extraction of surplus water or liquids from laundered or processed goods is of inestimable value to commercial, etc. laundries and the textile industry where a large volume of work has to be handled quickly and effectively at small labour cost in a minimum of space and time.

The maker's claim that the extractor introduces an advanced extraction technique in producing over one ton of processed work per hour, at a moisture retention figure varying from 43 to 48%, depending on the type of material being handled. It is also pointed out that one man can comfortably operate two extractors and condition or dry the combined output of the two machines where suitable tumblers are available.

Other points cited by the firm include (*a*) virtually no maintenance, (*b*) eliminates vibration and power surges and (*c*) safe, simple and extremely productive.

(left) The hydraulic extractor with stainless steel trolley containing the washed goods positioned within the extraction chamber

(right) View of interior of extraction chamber and the top of the hydraulically operated ram which rises to compress the washed goods within the mobile trolley. Safety door, in raised position, prevents access to the operating controls



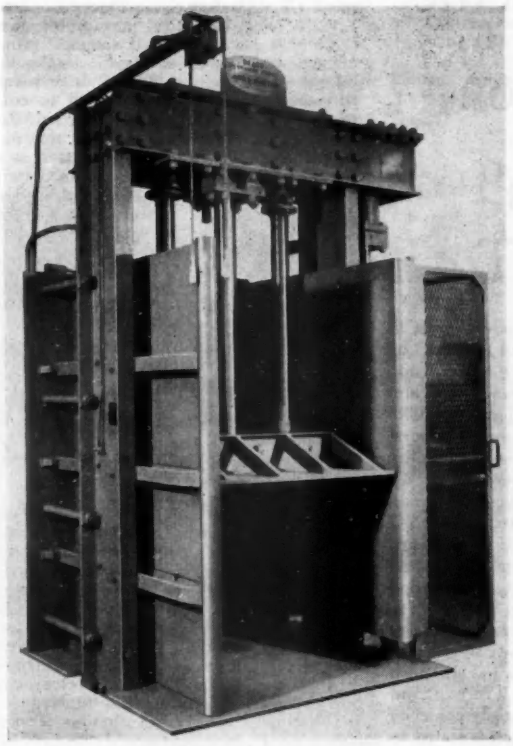
Opening and Filling Bags

A CHAIN of film bags and apparatus for opening them while they are filled by hand, form the process of an ingenious semi-automatic bagging system introduced from Sweden. Colodense Ltd., West Street, Bristol 3, licensees for the process in the U.K., will demonstrate the "Kangaroo" bagging process on the British Cellophane Ltd. stand at the International Packaging Exhibition, London, September 5 to 15. They also supply the loading equipment.

The film bags, linked so that they can be fed as a chain to the loading position, are not separated until transferred from the loading machine to a sealing unit. Then, only a slight pull is needed to part the filled bag from its neighbour. "Kangaroo" bags, produced from polythene film, are gusseted but made so that the front panel of the bag is narrower than the back. This design is used because it ensures that when air is blown into the bag, it bellies open into a shape which makes insertion of quite bulky articles a simple operation. The bags are partially cut, leaving a narrow bridge of film at both sides.

This bagging system was developed in Sweden by AB. Celloplast. They report that a team of two people working with the loading machine can fill and seal 600 bags an hour. "Kangaroo" bags are delivered stacked in zigzag style. The case containing them is stood on the floor under the loader. The leading bag is then pulled through a slit in the sharply-sloping platform on the machine. Immediately, the bag is inflated by an air-blower, so that the operator can slide an article down a shaped chute and into the bag. The weight of its contents then causes the bag to slide down the slope, pulling another empty bag through the slot. While the operator is filling the next bag, the second operator pulls off the first bag and transfers it to the sealing unit.

The Beaty Hydraulic Press



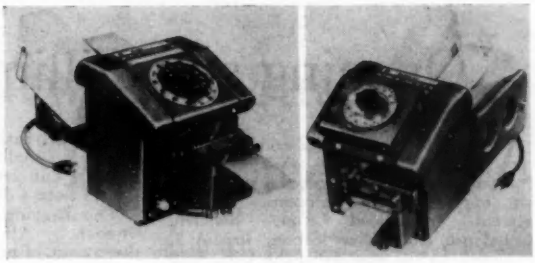
Combined with the "Avistrap" baling technique these presses are designed to offer speed, economy and safety in baling

This specially-designed Beaty hydraulic press was custom-built by James Hunter Inc. for use with chemical pigments, for E. I. du Pont de Nemours and Co. Inc., U.S.A. The Selta Corporation offers the services of the James Hunter engineering staff to adapt Beaty hydraulic press design principles to individual space requirements or processing limitations

SELTA CORPORATION of Charlotte, North Carolina, have been appointed sales representatives for Beaty hydraulic presses in North Carolina, South Carolina, Virginia, Tennessee, Georgia and Alabama by James Hunter, Inc., builders of the complete line of Beaty presses for use by the textile and related industries. Hunter builds a complete line of baling presses, using proved Beaty design principles. Selta customers now have the opportunity to select the dependable high-production unit best fitted to their baling application, while taking full advantage of the greater economy, ease of handling and safety of "Avistrap" strapping.

The Beaty hydraulic press line includes a number of standard models, with capacities from 50 to 110 tons, for baling waste, cloth and other materials. Significant in the line is a one-floor, up-packing drawbar type cloth baling unit with a 110 ton capacity, specially designed to save floor space by eliminating a ram pit. The platen top is level with the floor, and the press is yoke actuated by two single-acting hydraulic rams suspended from extended ends of the horizontal strain members. Other Beaty presses include a revolving double box unit with mechanical tramper, with 50 ton capacity, for uninterrupted baling operations; and other units with both up-packing and down-packing design. Already in wide use throughout the textile industry, these presses simplify and expedite baling, shipping and storage of fabrics, fibres, chemicals and other materials. Combined with the "Avistrap" baling technique, they offer the multiple advantages of dependability, speed, economy and high safety in baling.

U.K. Agents for Automatic Tape Dispensers



Dial-Taper and Twin-Taper

THE complexities of modern packing rooms with their increasing throughputs for both home and export deliveries are such that if packing requirements are to be met, manufacturers of packing room equipment are forced to incorporate automatic methods to an increasing degree. Leon Davis and Co. Ltd., 32 Holborn Viaduct, London, E.C.1, well known for their "Oyster Brand" gummed paper tapes, have now been appointed United Kingdom selling agents for the "Marsh" electrically operated taping machines. There are two models, the "Twin-Taper" and the "Dial-Taper." The "Twin-Taper" is an automatic machine that may be operated either by push button, foot pedal or by remote control. It will dispense, repetitively, two lengths of tape of any given length, each at variance to the other, within the limits of 3 in. up to 72 in. adjustment may be made in fractions and is carried out by the movement of two selector arms round a dial and in the centre of which is the locking knob.

Operation is simple, by plugging into the nearest mains socket, setting the selectors to the required lengths and switching on. The tell-tale pilot lamp will glow, a heater then warms the water in the brush tank and the machine is ready for work.

With the second dispenser, operation is by dial, similar to that on a telephone. By placing a finger in the hole opposite the length number required and dialling once, the length selected is immediately dispensed, freshly moistened and accurately cut off, ready for use. The standard model gives lengths of from 3 in. up to 39 in. in steps of 3 in. To obtain twice any length the dial must be rotated twice, rapidly. Like the "Twin-Taper", dispensing is carried out by means of a f.h.p. motor which runs only when actually dispensing. Both machines will take from 1 in. to 3 in. wide in rolls of up to 9 in. dia., the tape being easily loaded.

New A.E.I. Lighting Scheme in Cotton Mills

THREE of the most modern mills in the Bolton area and owned by Fine Spinners and Doublers Ltd., have been re-lighted by A.E.I. Lamp and Lighting Co. Ltd., at a cost of over £13,000.

Efficient lighting is an extremely important factor in the production of high quality yarns as it enables the operative to see better for creeling and piecing-up purposes. Over 13,000 F2160/1/8060 VU fittings, each housing a 5 ft. 80 watt, 3,600°K white tube, have been mounted on Mazda shallow trunking. Mounting heights, which varied from 8 ft. 3 in. to 10 ft. 6 in., were more or less dictated by the humidifier system and the construction of the building itself. Spacing has also been affected, and varies between 8 ft. 6 in. and 10 ft. 6 in. The lighting intensity achieved is 25 lumens per sq. ft., which is stated to be ideal for the most meticulous requirements in the mill.

New Catalogues

THERMOCOUPLES. Cambridge Instrument Co., 13 Grosvenor Place, London, S.W.1, have issued a new publication (List 325) describing their standard range of rare- and base-metal thermocouples for temperatures up to 1,500°C. In general, thermocouples are manufactured to customers' specifications and for particular applications, but certain types of thermocouple assemblies are now produced as a standard range and are immediately available from stock. The publication gives details of the factors governing the choice of suitable assemblies for widely differing applications.

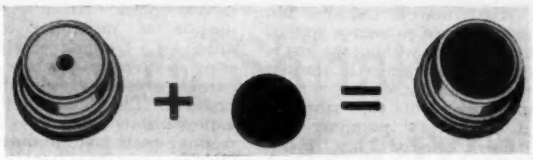
* * *

EXTRACTING CO_2 FROM FLUE GASES. An illustrated folder from Incandescent Heat Co., Ltd., Cornwall Road, Smethwick, Birmingham, gives full details of a new plant recently developed by the company. Designed to extract high purity carbon dioxide from waste flue gases from most types of combustion appliances, it is claimed that the impurities contained in CO_2 produced in their plant are very low on average.

* * *

HIGH TEMPERATURE GREASE. Publication No. 17 from Rocol Ltd., Rocol House, Swillington, Leeds, describes Molytherm grease and gives some convincing illustrations showing its remarkable heat stability properties. The folder also gives a striking list of successful high temperature achievements in the metallurgical, chemical, engineering, glass and textile industries during the twelve-month development period the new product has undergone. It is recommended for continuous service above 350°F., and withstands long periods above 450°F. and short periods up to 550°F.

Colour Caps for Oil-Tight Control Units



Pop-on push-button caps

A NEW range of oil-tight control units with even greater versatility than the company's existing range is announced by Square D Ltd., Cheney Manor, Swindon, with this new range, the same combinations as before are available but can be effected with reduced stocks. The new range of all-metal push-button switches incorporates a removable plastic colour cap which can be one of seven colours—red, blue, green, orange, brown, black or yellow. This plastic button gives a positive colour identification which, it is stated, will not fade even under heavy usage. Any oil-tight push-button will be available with one of the seven colour caps already installed.

Additionally, in order to reduce and simplify stocking, push-buttons will be supplied without colour caps. Colour caps are available separately in packets of six and fifty. It takes only seconds to assemble a button and colour cap on site. Consequently, any colour push-button operator can be made from a single uncapped unit and a supply of colour caps.

Gas-Fired Air Heater Designed for Russia

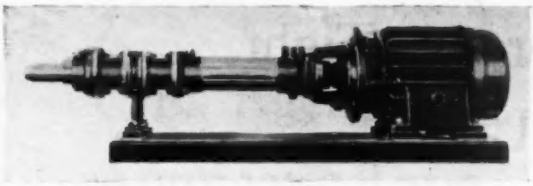
THIS photograph shows Mr. K. Zierer, capacity contracts engineer, of Urquhart's (1926) Ltd., Greenford, Middlesex, making a final inspection of plant built by the company for export to Russia. This gas-fired air heater has been constructed for the Engineering Division of Courtaulds Ltd., Coventry, who are building a fibre production plant in Russia.

The air heater is direct fired, burning natural gas-methane for supplying hot air to a vacuum filter drying a salt. The air heater works against a back pressure of 6 in. w.g. It has automatic control of outlet temperature which operates by variation of the gas quantity burnt by adjusting the effective area of the final annulus of the gas burner, the gas pressure being maintained constant at all times. Air/gas ratio is controlled by "slaved" pulling motors and cams and a full range of safety interlock is incorporated, including U.V. flame failure control, pressure switches and process interlock switches. The furnace used is an Urquhart high intensity combustion chamber and can be offered for a very wide range of heat requirements and for burning most commercially available gases.

Polythene Bodied Tipper Truck and Wheelbarrow

TWO additions to their range of moulded polythene containers and handling equipment, announced by WCB Containers Ltd., Shepley Works, Audenshaw, Manchester, are a polythene tipper truck (model 582) has a one-piece moulded polythene body, fitted to a tubular steel chassis, with large diameter wheels. Perfectly balanced, it is extremely light and easy to handle, but it drops flush to the floor for sweeping up, gathering swarf, and the like.

The polythene wheelbarrow also has a heavy all moulded polythene body, which is completely non-corroding; and it is fitted to an all steel tube chassis with large diameter wheels. Both are moulded in red or blue with contrasting sprayed finished chassis, and are available from stock.



Dispersion of Solids in Liquids

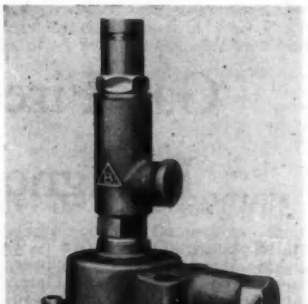
ANOTHER to their range of ultrasonic homogenising and dispersing units is announced by Ultrasonics Ltd., Westgate, Otley, Yorks. The Dispersonic has been specially designed for the high speed dispersion of powders in liquids and with it, emulsions containing solids can efficiently be produced. In the Dispersonic, rough mixes of powders in liquids or emulsions are passed in a thin stream at high velocity across a blade which is thus caused to vibrate at its natural frequency of 18 - 22 kc/s. Cavitation is induced and extremely high localised pressures applied within the liquid stream, without the loss of energy which normally occurs in transfer from one medium to another.

The unit consists of the vibrating element and an integral pumping unit driven by a direct coupled 3 h.p. motor. All stainless steel construction permits high standards of hygiene. Mounted on a steel baseplate it takes up only 5 sq. ft. of floor space. A wide variety of powders such as carbon black, colloidal clay, titanium dioxide or antibiotics can be rapidly dispersed. Difficult emulsions incorporating powders can be made with a very fine particle size. Viscous products present no problem. The throughput is stated to be approximately 5 galls./min. Replacement of working parts takes minutes only. Highly abrasion resistant materials are used to give long life. There is no aeration of the product, nor is there any heating effect as all sonic energy is used for dispersing.

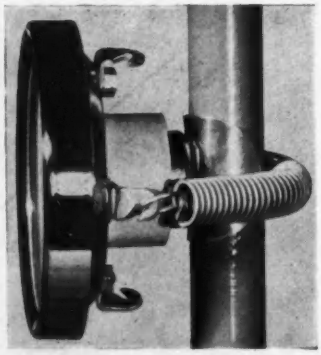
Excess Pressure Protection Valve

AN improved excess pressure protection valve for steam lines, which has a number of unique features, is announced by Sir W. H. Bailey and Co. Ltd., Albion Works, Patricroft, Manchester. One of the most important single characteristics is that the steam supply is not shut off completely in an emergency, the downstream reduced pressure always being maintained at the set level so that process work, etc. is not interrupted. The device includes a double-beat valve attached to a piston across which a pressure differential will be produced by any marked increase in inlet pressure. The effect of the differential is to lift the piston which brings the main valve closer to its seating faces, so that the downstream line is automatically protected from excess pressure. As soon as the supply pressure returns to normal, the valve automatically resumes its original position.

The incorporated relief valve, which is set to lift at a required safety pressure, will deal with any minor pressure rise, but a severe one will tend to close the main valve automatically, but still maintain a downstream supply at the pre-set reduced pressure. Another feature of this valve is a needle valve adjustment, the setting of which allows the performance characteristics of the valve to be matched to a specific application. It gives the valve flexibility of performance by controlling the amount of low pressure steam allowed to by-pass the piston. If the needle valve is opened only slightly the main valve will regulate flow when the permissible pressure rise is small. This extreme sensitivity tends to decrease with a wider opening of the needle valve. This improved device is available, initially, in bronze, with screwed ends, to fit pipe sizes ¾, 1, 1¼, 1½ and 2 in.



The new Bailey valve



The modification showing the spring attached to two of the clips, with two further clips available

Surface Thermometer Modification

A MODIFICATION to their spring fitting pipe surface thermometer, making one model adaptable for either horizontal or vertical pipes, is available from British Rototherm Co. Ltd., Merton Abbey, London, S.W.19. The thermometer now has four hooks—instead of two—at equidistant intervals at the rear of the dial. This allows the detachable spring, which clamps the thermometer to the pipe, to be fixed to the appropriate hooks, whatever the angle of the pipe. Previously, with the two clip model, it was necessary to stipulate a horizontal or vertical model when ordering.

The surface thermometers are designed for use where it is not convenient to insert the thermometer directly into the pipe. A soft copper saddle shaped to the contour of the pipe surface ensures maximum thermal contacts. The thermometer can be supplied with the spring suitable for pipes with a diameter of 1 - 1½ in.; 1½ - 3 in.; 2½ - 4 in.; 3½ - 7 in. Standard ranges are 50°/250°F. or 10°/120°C.

THE TEXTILE
COLOURIST & FINISHER

Modern Shrink-Resist Finishes for Wool*

Some of the early researches that ultimately led to the modern methods of today are reviewed. An outline is also given of the Melafix, Dylan Z and Dylanize processes, in addition to recent work carried out with potassium permanganate in saturated brine, resin impregnation, and peracetic acid and sodium hypochlorite

By A. N. DAVIDSON†

ALTHOUGH non-felting wool fabrics have been produced for many years, we cannot with any degree of certainty say exactly what chemical changes are required in wool to give a non-felting finish. Thus, although oxidative treatments lead to a rupture of the disulphide bond with the production of cysteic acid, many oxidising agents, e.g., hydrogen peroxide, give the same result without the production of a non-felting finish. Other shrink-resist methods presumably work by different mechanisms, e.g., the action of reducing agents or alkalis in non-aqueous solvents.

Before considering the chemical processes it is necessary to study briefly the effect of fabric structure on shrinkage. (We shall consider here knitted fabrics although somewhat similar conditions will apply to woven fabrics). During the war years Dutton investigated the effect of the structure of a plain hosiery fabric on the behaviour of the fabric during the normal finishing processes. He was able to show that the most important factor was the number of courses per inch in the fabric and that in general the tighter the knit the more stable the fabric became: even on a fabric made from completely non-felting yarn he found that slack knitting led to considerable shrinkage during washing. This work was continued after the war and Doyle found that the stitch density (i.e., the product of the number of courses and stitches per inch) is an important factor, and he was able to relate this property to the length of yarn knitted into each individual loop. By plotting these two values for a wide variety of knitted fabrics made from a variety of textile fibres, e.g., from fine gauge hose to heavy knitted outer-wear, he obtained a smooth curve which showed that the relationship could be expressed by

$$N = \frac{20}{L^2}$$

(where N = the stitch density and L = the length of yarn in an individual loop).

Further work has confirmed these results and has shown that the stable form of a plain knitted fabric is uniquely determined by the length of yarn knitted into an individual stitch and thus by controlling this length we have a means of measurement and control that is independent of the state of relaxation or distortion of the fabric at the time of measurement. Thus the first part of the problem, that is the production of a stable knitted fabric, is well on the way to being solved.

We have said earlier that the original shrink-resist process consisted of the treatment of wool fabrics in an acidified sodium hypochlorite solution. The quantities of reagent used were, and often are, worked out in an arbitrary manner but examination of some scientific work has enabled these quantities to be determined so that a more satisfactory process can be used. Speakman and Scott determined the amount of standard acid or alkail required to bring wool to a known pH value. By titration it is also possible to determine the amount of acid required to bring the sodium hypochlorite solution to the the same value and thus it is possible to calculate the amount of acid required to neutralise a known amount of sodium hypochlorite and to satisfy the acid requirements of the wool.

In using this method it is most satisfactory to keep to standard batch weights and a constant liquor/wool ratio. Suppose it is desired to treat 100 lb. of wool materials with 2% of chlorine at pH 2. We can calculate that 100 lb. of wool require 4 pints of concentrated hydrochloric acid to adjust the pH value to pH 2 whilst, in addition, the titration of sodium hypochlorite solution shows that each pint requires 0·38 pints of hydrochloric acid. Using such a hypochlorite solution 4·4 pints are required for each pound of chlorine and hence a total of 8·8 pints of hypochlorite is required to yield 2% on 100 lb. of wool. The concentrated hydrochloric

* *A paper given recently to the Huddersfield Section of the Guild of Technical Dyers.*

† *Wool Industries Research Association, Torridon, Headingley, Leeds.*

acid required is therefore (8·8 × 0·38) (+ 4 pints) = 7·34 pints. A table can be constructed by using similar calculations for different pH values of the bath and different amounts of chlorine and, assuming that the amount of wool and water are kept constant, this will provide a controlled method of treatment.

The first real development that took place in the process followed the discovery that the reaction-rate between wool and chlorine was considerably reduced when partially dried wool (approximately 7% regain) was treated with dry chlorine gas, while the use of reduced pressure enabled a satisfactory commercial process to be developed. By these means the reaction is restricted to the fibre surface because the wool is unswollen and only a very small amount of chemical treatment is required to give a high degree of unfeltability. Other early developments consisted of the modification of the fibres before chlorine treatment, i.e., by hydrogen peroxide; the use of strong alkalis in non-aqueous solvents; hydrogen peroxide in the presence of traces of metal salts; potassium permanganate (alone or followed by reducing compounds, or mixed with sodium hypochlorite, and more recently, in a saturated brine solution.)

Melafix CH and Melafix II Processes

Both these processes are modifications of the ordinary wet chlorination techniques, synthetic resins being used to combine with the free chlorine, the halogen being liberated in a controlled manner during the treatment. The two products Melafix CH and Melafix II possess different combining powers towards chlorine, Melafix II having the greater under similar conditions. Thus, two distinct methods of using the process are possible, one in which all the sodium hypochlorite is added at once, the other in which it is added under controlled conditions.

When treating yarn in either a Hussong or a cheese dyeing machine, it is preferable to add all the reagents at the beginning and therefore the Melafix II process is the preferred technique. When reagents can be added during the course of the treatment, Melafix CH is added initially and the sodium hypochlorite added over the total treatment time. In both cases, excess of the halogen is destroyed by the addition of a reducing compound or if preferred, in a fresh bath containing alkaline hydrogen peroxide.

It should be remembered that the resin plays no part in the production of the shrink-resist finish: it merely serves to act as a buffer for controlling the liberation of the halogen in a regular manner to the wool so that an even treatment is achieved. After the treatment a thorough rinse is required to remove all traces of the resin that may be adhering to the surface of the wool material.

Dylan Z

In this process wool materials are treated in a solution containing sodium hypochlorite, potassium permanganate and calcium chloride, to which a wetting agent and other chemicals may be added. The mixed solution gives an alkaline reaction and it is preferred to maintain the alkalinity during the treatment, if necessary by the addition of suitable alkalis. The mixed reagents give a stable solution that reacts slowly with wool materials thus enabling a level treatment to be obtained. The rate of the reaction is controlled by the initial pH and so when a very slow reaction is required the reaction of the mixed solution is adjusted to approximately 10, whereas when a vigorous agitation is possible, e.g., with materials in a paddle machine, an initial pH of 7·5 is satisfactory.

The reaction between the permanganate and the wool leads to a brown deposit on the fibres that is level when an even treatment has taken place: the brown coloration is removed by treatment with an acid solution of sodium bisulphite. The finished wool has a good colour, (increasing the amount of permanganate over that required for the shrink-resist finish gives a good bleach on the finally finished material) and a very soft handle. As with the earlier dry chlorination process, treatment before dyeing is possible because the level treatment assists the production of level shades.

Dylanize

A later process from the same firm as that which developed the Dylan Z finish is based on the treatment of wool in a solution of permonosulphuric acid (Caro's acid). Wool materials are treated in dilute solutions of the acid at a pH value of less than 8, followed by treatment with an aqueous solution, or a dispersion, of a salt of sulphurous acid, the normal salts being preferred. If the acid salts are used it is necessary to rinse the material after the acid treatment before entering into the sulphite solution. The reduction treatment is an essential part of the treatment and suggestions have been made that atmospheric oxidation before reduction is beneficial.

In the treatment with the per-acid, dilute solutions require long reaction times, while the use of more concentrated solutions reduce the necessary time of reaction. This latter offers the possibility of continuous treatment and in the relevant patent specification examples are quoted to show that both wool top and fabric may be processed continuously to give a satisfactory shrink-resist finish.

Potassium Permanganate in Saturated Brine

Recently, workers in the C.S.I.R.O. in Australia have announced that a satisfactory shrink-resist process, particularly for wool fabrics, consists in the treatment of wool materials in a saturated (30%) common salt solution containing potassium permanganate. No chemical control is required, the material being run in the solution until the colour due to the permanganate is destroyed: the colour imparted to the material is removed by treatment in a warm acid solution of sodium bisulphite. The saturated brine solution may be re-used after the addition of more potassium permanganate.

Good colour and reasonable shrink-resistance are claimed for the treated materials and it is stated that the reaction is restricted to the surface of the fibres, presumably by the non-swelling action of the saturated brine. The ease of operation and the lack of chemical control suggest that the process may be ideal for mills that do not have a trained chemist available, but the lecturer would like to know more about the action of saturated brine on stainless steel machinery before giving an unqualified approval to the process.

Resin Impregnation

While many resin impregnation treatments have been reported from America, and elsewhere, none seems to have found use in this country. This is probably because large amounts of resin are required with a consequent deterioration of the handle of the wool, while the high temperatures required for curing the resin may spoil both the colour and the handle.

Peracetic Acid and Sodium Hypochlorite

Although claims have been made that peracetic acid alone will render wool non-felting, strong solutions are

required and the treated wool has poor wearing properties and develops a hard handle after washing. Workers at W.I.R.A., however, showed that wool materials were made shrink-resisting without impairing the wearing properties or the handle by treatment in a dilute solution of peracetic acid, followed by treatment in *either* a sodium bisulphite solution containing a proteolytic enzyme (papain) *or* an aqueous chlorine-containing solution. Because two bath processes are inconvenient and expensive to use, attention was directed to the use of a mixed solution containing peracetic acid and sodium hypochlorite and the preliminary experiments showed that a satisfactory degree of shrink-resistance could be achieved by the use of very small quantities of the reagents.

Chemical analysis of the solution during the treatment of wool fabric showed that less than 60% of the reagents were used in 5 minutes compared with over 90% in less than 1 minute when the conventional wet chlorination technique (sodium hypochlorite and a mineral, or organic acid) was used. Thus a much slower rate of reaction was obtained by the new method and this was illustrated by the very level treatments that were obtained. To remove the final traces of the reagents from the wool, sodium bisulphite was added to the solution at the end of the treatment and the materials run in this reducing solution for a further period of time. The general result obtained from all these experiments showed that a high degree of unfeltability combined with a good colour and a soft handle were obtained.

Although the treatment of wool materials in the new solution gave a much slower reaction than that obtained with the usual wet chlorination methods, the rate was still too fast to permit the method to be used for yarns treated on a Hussong, or a cheese dyeing machine. It is well known that sodium hypochlorite will react more slowly with wool under alkaline conditions than under acid and experiments showed that a similar result was obtained when peracetic acid was mixed with the sodium hypochlorite.

To determine the optimum conditions, samples of wool fabric were treated in solutions containing fixed quantities of sodium hypochlorite and peracetic acid adjusted to different pH values and it was found that the reaction was slow enough at pH 8·5 to enable yarns to be treated with a level result. The alkaline solution was, however, much less efficient in producing a shrink-resisting finish than an acid one and to obtain a satisfactory degree of shrink-resistance it was necessary to increase the quantities of the reagents by 30 - 50% over those required for the acid treatment.

The use of all these methods under commercial conditions has shown that excellent shrink-resistance, coupled with a good handle and colour, may be obtained and that good dyeing results may be obtained on the treated materials. The only shades with which difficulties have been encountered are pastel blues and pinks on materials treated by the alkaline process. It may be pointed out, however, that other processes give rise to similar difficulties.

Some of the other advantages claimed for the process are summarised as follows:—

(1) Although an acid solution of sodium hypochlorite is used in one form of the process, no evidence has ever been obtained of the liberation of free chlorine, even if the solution was adjusted to pH 4 by sulphuric acid. The only gas that was ever liberated was chlorine peroxide and this only occurred when the wool materials had been scoured with soap and ammonia: no other alkali gave the result. Thus, materials scoured in an ammonia-free detergent solution (soap or synthetic) may be processed in an open shed without the use of extractor fans and without any discomfort being caused to the workers.

(2) No loss of wool substance occurs during the processing (a slight increase in weight is usually found and this is unaltered by considerable washing or milling in soap): this result, again, is in sharp contrast to all other aqueous chlorination techniques known to the lecturer.

(3) The process may be operated in normal dyehouse machinery, that made from stainless steel being preferred.

(4) Processing costs are low, only small quantities of reagents being used, while the time for the complete treatment is of the order of 1 - 1½ hours for the acid process and 1½ - 1½ hours for the alkaline.

(5) The process has a similar action on dyes to that found with other processes, i.e., the effect on shade and wash-fastness is only slight on good dyes.

During the time the process has been used commercially a wide range of wool materials treated has included fabric (woven and hosiery), garments (under-, and outer-wear), half-hose, blanket fabric (milled and cellular) and woolled sheep-skins (the process being used as a pre-dyeing process for heavy shades). Woven fabrics after treatment have been shown to possess excellent printing properties.

Indicating Pneumatic Temperature Controller

Front view of the new indicating temperature controller

THE indicating pneumatic temperature controller made by Cambridge Instrument Co. Ltd., 13 Grosvenor Place, London, S.W.1, is an instrument for controlling the working temperatures of vats, or other similar containers; and the temperatures of refrigerating, air-conditioning, or other similar plants and processes, between — 20°C. and + 340°C. (— 10°F. and + 650°F.).

When the temperature of the container or process rises or falls beyond a predetermined level, the controller automatically cuts off the piped supplies of heating or cooling fluid or gas until the temperature returns to the pre-set level. The controlled temperature can either be that of the process or container itself or, less frequently, that of the piped supplies. The instrument can be used in almost any industrial process where the flow of heating or cooling medium can be regulated by a diaphragm valve.

Precise Control of Textile Atmospheric Conditions

Factors discussed include efficient instrument maintenance, control of heating and air-conditioning plant for round the year use, control of dual duct systems, evaporative cooling systems and sensitive control of atomisers

By F. H. SLADE, A.M.I.MECH.E.

PRESENT-DAY manufacturing standards require the accurate measurement of many variables in textile processing, such as temperature, pressure, flow rate, humidity, dewpoint, liquid level, moisture content, etc. Not only must measurement be effected, but in many cases, it is essential to record continuously, and also control within narrow limits, the values of these variables. The latter function is particularly important. Generally, the application of automatic control has resulted in labour savings, combined with improved process efficiency and reduced plant operating and maintenance costs, that have more than offset the added expense of instrumentation.

So far as the latter is concerned, the major part of the capital investment required is for instrument costs, installation-labour costs and expenses for auxiliary equipment and materials. The total cost of instrumentation depends upon the amount of control required, and this has been assessed as mounting from 3 to 30% of the purchased cost of all equipment. A further interesting fact is that, depending upon the complexity of the instruments and the service, it is estimated that additional charges for installation and accessories may amount to 40 to 80% of this purchase cost, with the installation charges being approximately equal to the cost of the accessories.

Proper instrumentation of a process plant is not only initially costly, but a skilled job; particularly if problems caused by transmission errors, cycling due to slow or uncompensated response or similar factors are encountered. They may, however, be eliminated by proper design. Thus both considerable cost and technical knowledge form the foundation for the installation of a successful system of instrumentation. Once in operation, any deviation from design conditions will have a marked effect on process efficiency which will be avoidable only by proper servicing and maintenance.

Maintenance

Instrument maintenance, as with other types of plant and equipment, can be classified into two groups, preventive and breakdown; the ratio of preventive to breakdown maintenance carried out by an instrument user being to a degree proportional to the number of instruments in use. Large instrument users usually have comprehensive preventive-maintenance schemes, whereas firms with only a few instruments tend to rely on breakdown maintenance. This situation is, no doubt, influenced by the technical qualifications and practical experience of the maintenance staff.

Unfortunately, the evaluation of the comparative costs of preventive and breakdown maintenance is not easy, especially as plant efficiency, and hence cost, is very often dependent on instrument efficiency. As will be appreciated the cost of the plant inefficiency can be extremely high when compared with the cost of maintaining the instruments in working order. Further points to be considered are that breakdown maintenance is obviously not predictable, and if breakdown maintenance alone is carried out there may be a tendency to replace only the actual component causing the breakdown. Further breakdown is then liable to occur involving other components which have not been checked, leading to repetitive breakdowns. This unpredictability of breakdown maintenance can lead to prolonged failure of certain types of instrument which cannot be isolated without shutting down the whole plant. Comparative costs of preventive and breakdown maintenance have,

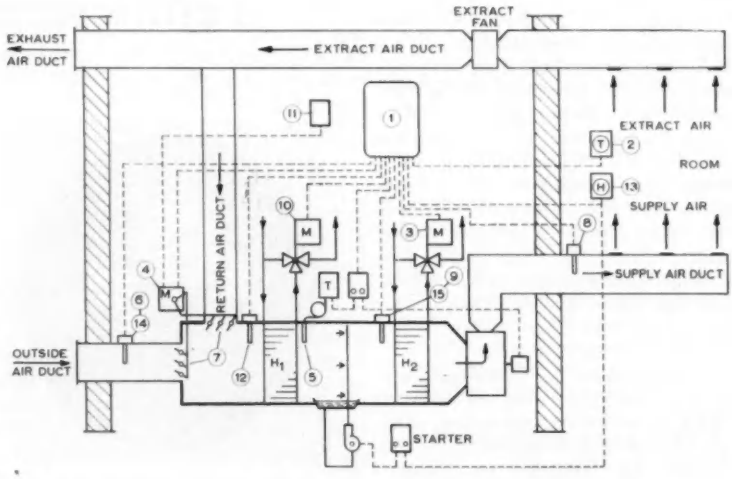


Fig. 55. Control of an air-conditioning plant with fresh-air and recirculation dampers preheater, washer with no cooling but with afterheater. (courtesy, Thermocontrol Inst., Co., Ltd.)

however, been estimated in some large industrial concerns, and it has been shown that properly organised preventive is definitely a paying proposition.

Another important problem is that of how much maintenance should be carried out and at what periodic intervals. This is sometimes dictated by plant conditions. If a plant is shut down for a very limited time because of a breakdown of plant machines, the engineer has to employ the time allowed to the best advantage by considering the general state of the instruments and the availability of those instruments while the plant is operating. However, if the plant is shut-down for a major overhaul it is often considered politic to overhaul completely all the instruments. The matter of maintenance is further complicated by the fact that a certain type of instrument may work efficiently in one application for one year, but in another application it may only work for a period of two months.

Most instrument manufacturers supply instruction books which advocate some necessary maintenance schedules. However, it should be borne in mind that these schedules are only a guide to the instrument user, and the actual necessary maintenance might be greater or less, depending upon the particular application. It is, therefore, suggested that for a trial period, in order to establish a preventive-maintenance schedule, the only maintenance carried out, apart from breakdown maintenance, should be that advised by the instrument maker. A comprehensive record would be kept showing every adjustment made to any instrument, and from this information a preventive-maintenance schedule could be formulated. A card system could be used, one card being kept for every individual instrument, and the different types of instruments could be sectionalised. Before considering the different aspects and procedures of instrument maintenance, it is first necessary to examine the functions of the various controls used in textile processing; commencing with those applied to air-conditioning plant.

Control Systems

The demand on a heating or air-conditioning plant is influenced by outdoor temperature, transmission of heat to or from the conditioned space, demand for fresh air (i.e. ratio of fresh air to recirculated air), sun radiation, window area, local heat gains and occupancy. The plant is designed for maximum demand, which, as a rule, rarely occurs. The delivery from the plant has therefore to be adapted to the existing demand by means of automatic controllers which need ever higher standards of performance with modern progress in air-conditioning technique.

Design of air conditioning plant, however, embodies almost endless variation; to suit the application. Each case is considered separately on its own merits. Corresponding variants occur in the applied control systems and, as such, it is only possible to select a few typical examples. One of these is illustrated diagrammatically in Fig. 55; providing control of an air conditioning plant with fresh-air and recirculation dampers, preheater, washer, with no cooling, but with after-heater.

In the absence of provision of cooling for the spray water the use of an overriding humidistat to shut off spray pumps when the humidity rises beyond control is adopted. Alternatively the space temperature can be raised in order to lower the humidity to the desired value by override of room temperature control or by compensation of space temperature by the dew-point temperature. The control of fresh-air and recirculation damper may be manual or by dew-point control. A frost protection feature prevents the freezing of the heater batteries and washer during shut-down periods.

With the basic control scheme, any temperature deviation from the desired value in the conditioned space is sensed by room thermostat (2) which exerts control action on the motorised valve (3) regulating steam or hot water flow to the after-heater battery (H2). On any deviation of the dew-point from the desired value as measured by dew-point thermostat (9), the preheater battery control valve (10) will regulate steam or hot water to the preheater battery until the correct conditions are restored. When the wet-bulb temperature of the air entering the plant rises above the dew-point desired value the spray water will assume the wet-bulb temperature, and the dew-point thermostat (9) becomes inoperative. The overriding humidistat (13), set higher than the normally desired humidity value, will shut off the spray pump; using a time delay relay to avoid pump chatter, which would otherwise accompany rapid changes in the humidity condition.

The fresh-air and recirculation dampers may be manually positioned by the setting knob of the potentiometer mounted in the manual positioner for the fresh air/recirculation dampers (11). Thus, maximum recirculation may be used (subject to a small minimum fresh air quantity) when the outside temperature is low, to save the use of excessive heating capacity, by closing the fresh-air inlet. When the atmosphere is lower than the desired room condition, but the room conditions are tending to rise above the desired value, the dampers are positioned to give maximum fresh air.

Alternatives to the basic control scheme, to increase the scope of control or to secure control through measurement of different process variables, is secured by the use of auxiliary control devices. Thus, compensator (6) gives automatic variation of the desired value of the room temperature, according to the fresh-air temperature and/or for compensation of the proportional offset for different loads. The supply-air duct compensator (8) stabilises the control system reducing the rise of hunting, because it rapidly senses changes in temperature and then restricts movement of the control valve (3). This reduces over-correction by the room thermostat (2), which has an appreciable time-lag between calling for a change and detecting the resultant temperature change due to the control action previously initiated. The wet-bulb compensator (12) which gives a measure of the load on the preheater battery (assuming total air volume is constant) can compensate the dew-point thermostat (9) and eliminate offset due to the proportional band of the dew-point controller.

When the wet-bulb condition of the air entering the plant is above the desired dew-point value, causing the relative humidity in the conditioned space to rise, a room humidity controller (13) may be used to override room temperature control raising the room temperature sufficiently to maintain the relative humidity. Alternatively, the space temperature may be increased to maintain constant humidity, notwithstanding the rise of the dew-point from the high wet-bulb conditions of the air entering the plant, by a dew-point controller (15). A further alternative is to raise the dew-point temperature to correspond to the effect of the compensation of space temperature by outside-air temperature. Thus, on rise in space temperature, it is possible to raise the dew-point sufficiently to maintain the relative humidity in the space at the desired value. The outdoor compensator (14) may be housed in the

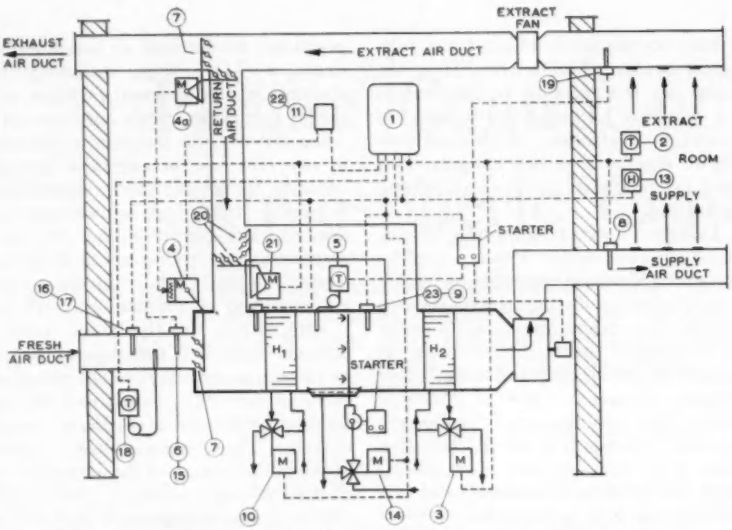


Fig. 56. This control scheme provides for round-the-year air-conditioning. It incorporates the desirous feature of by-passing the conditioning plant to save refrigeration capacity and heating load. (courtesy, Thermocontrol Inst., Co., Ltd.)

same pocket as the space temperature compensator (6).

Automatic operation of the fresh and recirculated air dampers is provided by arranging the dew-point controller (9) to control the damper motor (4) in addition to the preheater valve (10), either to close the fresh-air damper and open the recirculated air damper, when, through low outside temperature conditions, the preheater battery capacity is exceeded, or alternatively to restrict fresh air before using the preheater battery; in order to save fuel. A frost protection thermostat (5) may be located after the air heater, to trip the fan motor starter at a temperature of approximately 40°F. The fan motor then stops and the fresh-air damper is closed by the damper motor (4), energised by an auxiliary contact in the motor and/or a relay in the central control (1).

Fig. 56 shows a scheme designed for the full control of a round-the-year air conditioning plant, by means of which working and/or process conditions are maintained constant irrespective of climatic conditions; throughout the year. The plant incorporates fresh-air, recirculation and exhaust dampers, preheater, washer with chilled water supply, afterheater, face and by-pass dampers for air passing the washer. An installation of this type has the feature of by-passing the conditioning plant with the objective of saving the excessive refrigeration capacity in chilling both fresh and recirculation air with subsequent increased heating load to raise temperature to space temperature requirements.

Control of recirculation air achieves the dual function of control of sensible heat extraction and of dehumidification whilst still economising on refrigeration capacity. Control to allow for increasing moisture extraction when approaching the lowest dew-point temperature at which the refrigeration plant operates at reasonable efficiency is also provided. A frost protection feature prevent freezing of the heater batteries and the washer during shutdown periods. Automatic control of fresh, recirculation and exhaust-air dampers may be added to the control scheme if required.

Room thermostat (2) exerts control action on motorised valve (3), as in the case of the scheme illustrated in Fig. 55. Duct thermostat (9), again, regulates the flow of steam or hot water to the preheater battery, through valve (10). This control action applies when the air entering the plant has a condition of low wet-bulb temperature. When the wet-bulb condition of the entering air rises above the desired value of the dew-point the valve (10) is closed, and after a predetermined dead zone has been passed the control action or dew-point thermostat (9) will be exerted on spray water temperature control valve (14). This opens to the chilled water supply and closes to return water with rise in dew-point temperature.

The fresh-air and recirculating and exhaust dampers are positioned by the setting knob of the potentiometer. Under normal circumstances this system will operate with a fresh-air supply volume which is predetermined and will not be varied during operation. As air leaving the conditioning plant will be at the set dew-point, the space temperature may be reduced by increasing the volume of air passed through the plant and which is passed to the supply duct in a cooled condition. On upward deviation of the space temperature measured by controller (2), control action is exerted on the face and by-pass damper motor (21) in such a manner that the by-pass is reduced, and the recirculating air passing through the plant is increased until the space temperature is reduced to the desired value.

Compensator (6) (winter compensator), gives automatic change of the desired value of the room temperature, according to the fresh-air temperature and/or for compensation of the proportional offset for different

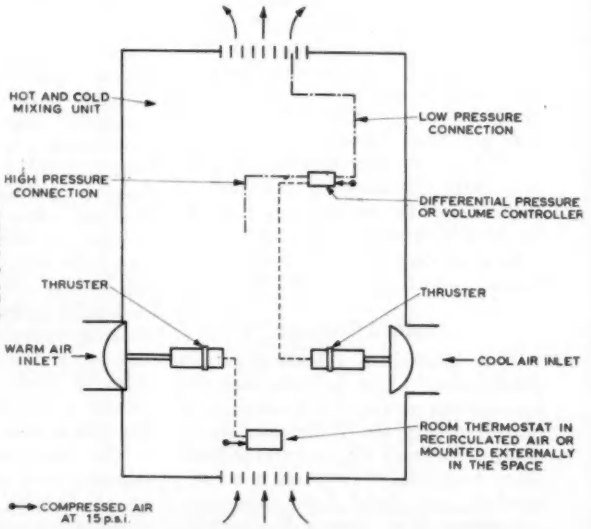

HOT AND COLD MIXING UNIT
LOW PRESSURE CONNECTION
HIGH PRESSURE CONNECTION
DIFFERENTIAL PRESSURE OR VOLUME CONTROLLER
THRUSTER
THRUSTER
WARM AIR INLET
COOL AIR INLET
ROOM THERMOSTAT IN RECIRCULATED AIR OR MOUNTED EXTERNALLY IN THE SPACE
COMPRESSED AIR AT 15 p.s.i.

Fig. 57. The differential pressure controller through the thruster unit, opens and closes the cool air damper directly while the thermostat, through its thruster unit, directly operates the warm air. damper (courtesy, Drayton Controls Ltd.)

loads. The supply-air duct compensator (8) stabilises the control system used instead of, or in addition to, the fresh-air compensator (6). Addition of summer compensation (15) allows a ratio of increase in space temperature with increasing outside air temperature. This avoids the shock of abrupt change from high outside temperature to space temperature cooled to normally accepted comfort temperature. A fresh-air inlet thermostat wet-bulb (18) is used to "detect" change from summer to/from winter conditions and changes over to the appropriate compensating thermostat.

To eliminate offset corresponding to the throttling band of the dew-point controller (9), a wet-bulb controller (12) can be used to measure the heat content of the mixed-air inlet to the plant, and thus the load on the control sub-system formed by items (9) and (10). The appropriate setting of the compensation authority can give constant dew-point under varying load conditions.

Where the space temperature is varied by operation of the compensators (6) or (15) correction of the dew-point is required so that the dew-point corresponds to the desired value of humidity for the space temperature. This is carried out by a relative humidity compensator (13) mounted in the room or in the extract duct. The dew-point temperature may also be varied to correspond to the effect on space temperature of the compensators (6) and (15). Thus on rise in space temperature it is possible to raise the dew-point sufficiently to maintain the relative humidity in the space at its desired value. A corresponding adjustment can be made on the lowering of space temperature. The summer and winter outdoor compensator elements (16) and (17) may be housed in the same pocket, the changeover carried out by a thermostat (18). The dew-point temperature may be varied as an alternative to space relative humidity, by the wet-bulb condition of the extract air. The wet-bulb controller in the extract air (19) compensates dew-point controller (9). The authority of compensation and the proportional band of the controller depends on the predetermined schedule of space temperature compensation.

To avoid reaching the zone of dew-point where the normal spray water system ceases to be effective for dehumidifying purposes it is necessary to increase the volume of air, which, on passage through the conditioning plant, is dehumidified. A dew-point controller (23) overrides the control of the face and by-pass dampers so that, on approach to the dew-point condition the face damper opens and the by-pass damper closes so that increased air passes over the plant for dehumidification. Thus, the total moisture extracted may be increased without lowering the dew-point. Following the loss of control of space temperature by the face and by-pass dampers the afterheater battery maintains the space temperature; regulated by valve (3).

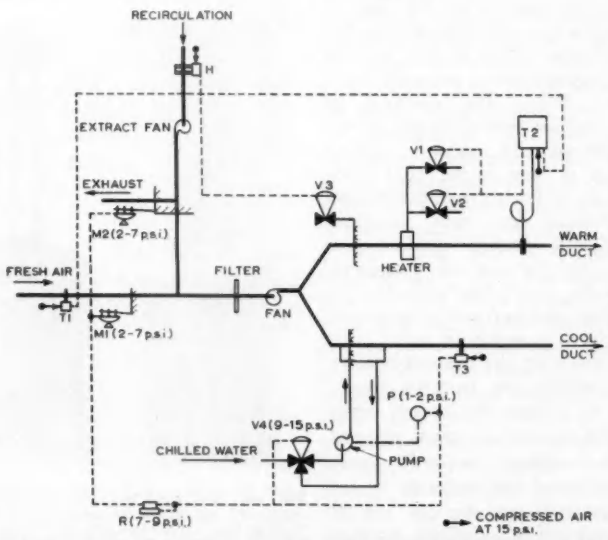


Fig. 58. Diagrammatic layout of one type of central plant employed in conjunction with high velocity dual duct-system

Control of Dual Duct Systems

Here, cool air and warm air are separately ducted at high velocity to individual mixing units located in the spaces to be conditioned. The system, provides for the (1) automatic control of individual temperature requirements in all spaces or zones, (2) simultaneous heating of some spaces and cooling of others and (3) centralised location of all the air-conditioning plant; simplifying operation and maintenance and eliminating water piping and wiring to the conditioned spaces.

The volume of air emitted by the mixing unit is maintained constant under all conditions by means of a pneumatically operated differential pressure controller, which measures the differential pressure across the outlet grill. Compressed air at 15 p.s.i. is fed to the controller and dependent on the differential pressure being measured, the controller applies pressures of 0 - 15 p.s.i. to a thruster unit which positions the air inlet damper or dampers to maintain the differential pressure and consequently the air volume constant. A room thermostat, mounted in the conditioned space or alternatively inside the mixing unit in the stream of induced recirculated air, maintains the temperature constant. Compressed air at 15 p.s.i. is supplied to the thermostat which applies pressures variable between 0 and 15 p.s.i. to a thruster unit similar to that operated by the differential pressure controller. This positions the air inlet dampers.

In one type of mixing unit, now shown diagrammatically in Fig. 58, the differential pressure controller, through its thruster unit, opens and closes the cool air damper directly while the thermostat, through its thruster unit, directly operates the warm air damper. Another type of unit utilises coupled dampers and linkage and here the thermostat through its thruster unit moves both dampers in such a direction as to admit less warm and more cool air on a rise in temperature and vice versa on a fall in temperature. The differential pressure controller, through its thruster unit, maintains the volume constant by opening or closing both dampers without altering the proportions of hot and cool air admitted.

The basic controls for one type of typical plant are shown diagrammatically in Fig. 59. The fresh air damper is arranged with a stop so that the minimum fresh air design conditions are met. The exhaust damper is normally closed and recirculation

Fig. 59. Evaporative cooling system in ring room. Moisture is introduced directly into the room atmosphere by self-cleaning atomisers and automatically controlled by humidistats. (courtesy, American Moistening Co., Ltd.)

damper normally open. Duct thermostat T1 in the fresh air intake resets the control point of submaster thermostat T2 so that for the minimum fresh air temperature T2 controls at the maximum design temperature. As the fresh air temperature rises T2 is reset downwards to a minimum temperature a few degrees above the average desired room temperature. T2 controls the heater and because of the wide load involved it is recommended that two valves V1 and V2 are used, sized for one-third and two-thirds full load respectively and operated sequentially.

Thermostat T3 controls the cool air duct at (say) 50°F. On rising temperature, pressure switch P starts the spray water pump. On further rise in temperature T3 operates damper motors M1 and M2 through relay R to open the fresh air and exhaust dampers and close the recirculation damper. Further rise in temperature causes relay R to close the fresh air to minimum, close exhaust and open recirculation. If the temperature continues to rise, the thermostat then opens the three-way valve V4 to admit more chilled water and less recirculation to the sprays. Humidistat H, in the recirculation duct, controls the valve V3 on the sprays in the warm duct.

Variations of this scheme can be used. For example, T3 can be made and submaster thermostat reset upwards by T1 during winter conditions with economy in the heater load of the warm air duct. If desired, the fresh air duct damper motor can be arranged to shut completely when the fan is shut off, while a preset minimum opening is maintained when working. It should be observed that the plant described, having no reheat in the warm duct, cannot necessarily maintain humidity conditions during periods of light sensible heat load.

Evaporative Cooling Systems

The desired working conditions involving close control of humidity and temperature may, in a number of instances be provided by a straight humidification and ductless evaporative cooling system; such as is shown in Fig. 59. With this, moisture is introduced directly into the room by self-cleaning atomisers and automatically controlled by humidistats. Outside air is blended with recirculated room air within the evaporative cooling units to maintain comfortable working temperatures. When the problem of efficient machine operation was solved by producing the needed relative humidities it was found that both temperature and relative humidity can be controlled for both machine efficiency and worker comfort and efficiency by the use of atomisers. Through the controlled introduction of outside air and increased evaporative capacity, it is possible in some processes to maintain the desired relative humidity within the working space, and also to reduce the indoor temperature to as low as seven degrees above the outside wet-bulb temperature during hot summer days. This is accomplished by the use of fan-operated and thermostatically controlled ventilating units which are placed in openings in the outer walls of the building.

The units can be controlled to deliver any mixture between 100% outside air and 100% recirculated room air. For cold weather operation, optional heating coils within the units can be used to supply heat during the start up of operations, and as needed thereafter, while recirculating 100% room air. In hot weather operation, up to the same quantity of outside air is supplied by the units as required to reduce the temperature within the room and provide more productive working conditions. The fans in the units promote air movement within the room to produce intimate, uniform mixing of water vapour and air. This constant movement minimises the development of hot, dry zones near electric motors and other points of high heat input.

The atomisers employed are self-cleaning, and on and off action is controlled by means of a humidistat, one of which is shown in Fig. 60. This uses for the sensitive element a natural material, taken from the linings of the intestines of cattle, which shows a large response to changes in relative humidity, without being appreciably affected by changes in temperature. Amco humidity controls are subject to constant improvements. The latest models, for example, use a patented change-anticipating mechanism for mechanical feed-back to greatly increase the sensitivity of the interpretation of changes in dimensions of the natural humidity sensor. This gives a finer control of relative humidity than was previously available.

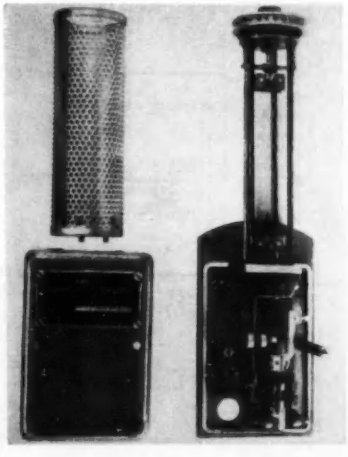


Fig. 60. The latest models included in the range of Amco humidity controls use a change-anticipating mechanism for mechanical feed-back, to increase the sensitivity of the interpretation of changes in dimensions of the natural humidity sensor

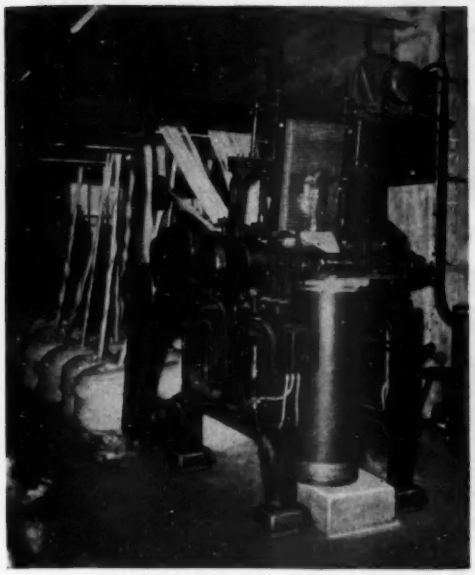


Fig. 1. Gill box by Prince-Smith and Stells Ltd., on Metalastik "Cushyfoot" anti-vibration mountings. (courtesy: Van Wijk and Heringa, Leiden, Holland

Fig. 2. Six anti-vibration mountings, one under each foot, are employed to isolate the vibration from this tufting machine. (courtesy: Tufting Industries Ltd. Bradford)

Resilient Mountings for Vibration Absorption

Resilient machine mountings not only tend to reduce noise caused by vibrations but they also protect the machine itself to reduce maintenance to a minimum and facilitate more accurate work with fewer stoppages

By "TECHNICAL CORRESPONDENT"

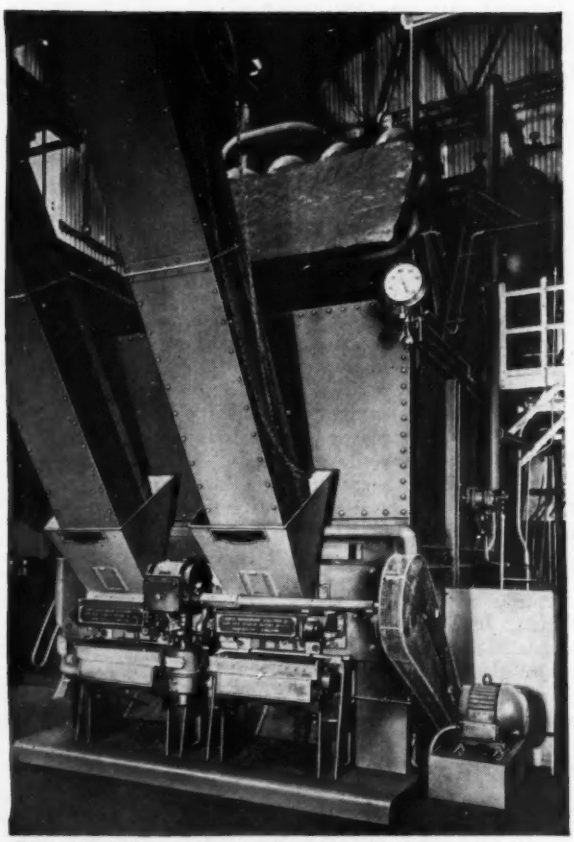
THE suppression of vibration, as affecting machine efficiency, has always presented a problem of infinite magnitude. Of equal importance is the reduction of noise, arising from vibration in machinery and equipment or from surrounding structures to which it is transmitted. Nearly all operating machines vibrate, and if these vibrations are of a frequency above 50 c.p.s. they will be within the audible range. Design to prevent vibrations at their source has, in some cases of individual operation, resulted in reasonably quiet conditions. Should, however, the frequency of the machine synchronise with some part of the structure in which it is housed, or if operating conjointly with other machines, the vibrations might well be amplified to nuisance value.

Rectification is secured by attention to foundation structures, for, as the natural frequency of a body, or the frequency at which it vibrates most readily, is dependent on the static deflection of its whole mass in relation to its supporting structure, it will be seen that the natural frequency may be controlled by varying the flexibility of the point of support and thereby changing the deflection of the supporting mass. Stress should, nevertheless, be accorded to the extreme care necessary in determining the flexibility of the supporting units, as haphazard selection can well produce a worsening of the vibration conditions.

The same general principles of isolation apply to all machines, but in practice, the methods employed will vary with the machine type and circumstances of installation. Furthermore, they are also the same for isolating machines susceptible to the effects of external vibration. In both cases the machine to be isolated should be supported elastically so that free energy of vibration is dissipated in internal friction in the supporting medium, whilst in the former case the supporting elastic medium under its load must have a natural frequency well below that of the machine, and in the latter, a frequency much less than that of the incoming vibration.

Although many means are employed for preventing the transmission of vibration it is generally found in practice that most of these suffer undesirable disadvantages when compared with anti-vibration mountings or units in which rubber or similar plastic material is employed as a resilient medium. Amongst the main points relating to the latter type of anti-vibrator, the most outstanding are that (*a*) the resilient medium can be concentrated in units of convenient size in order to afford control of the unit load and unit deformation, thus fixing the natural frequency to the damper and thereby making it possible to entirely avoid resonance conditions and, (*b*) anchoring can be obtained without impairing the vibration properties of the damper.

COAL—properly used—is the cheapest fuel for the Textile industry



Coking stokers feed coal continuously, quietly and invisibly into this modern boiler.

The very range and complexity of the Textile Industry makes it extremely sensitive to the fluctuations in the industrial barometer as the fickle demands of fashion make one fabric popular at the expense of another. Thus, no part of this great industry can afford to ignore any possible economy, any possible improvement that will keep prices competitive while satisfying—and expanding—markets both at home and overseas.

BEGIN AT THE BEGINNING—THE BOILERHOUSE

There are still some textile firms that handicap their finances with outdated boilerhouses. To modernise other machinery while 'making-do' with inefficient boilers is to throw good money down the drain. Coal-burning installations, mechanically stoked, can be so efficient that they will more than pay for themselves in a remarkably short time. They are, without question, the first essential in a factory that is going to make rising profits for its management.

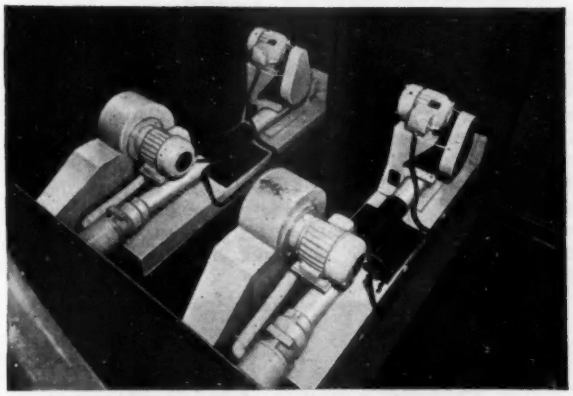
COAL IS THE RELIABLE FUEL

One question for any long-term planning is obvious: can supplies of coal be guaranteed? The answer is yes—without qualification. The mining industry—Britain's largest single industry is becoming increasingly efficient; its equipment is the best of its kind. And British coalfields contain enough coal to supply every industrial demand for centuries to come.

COAL IS CLEANER, HOTTER

Modern grading and washing methods ensure that coal is the most efficient and consistent fuel for every type of boiler—the ideal fuel for every section of the textile industry. But to obtain the maximum heat at the lowest cost, coal should be mechanically stoked. A mechanical stoker automatically feeds the right amount of coal for the boiler load even when the load is varying; it burns coal at optimum efficiency all the time without the emission of smoke (thus complying with the regulations in Smoke Control Areas) and it virtually replaces the human element in boiler operation.

There are many types of mechanical stokers, of which the most commonly used are the Chain grate stoker, the Coking stoker, the Underfeed stoker and the Sprinkler stoker. Standard models are available for all sizes of boiler.



Two underfeed stokers which will feed coal direct from a storage hopper into a modern vertical boiler.

OVER 80% OF BRITISH INDUSTRY USES COAL

The National Coal Board is determined that COAL shall continue to be plentiful, shall continue to keep our industrial power both dominant and progressive. You can depend upon COAL: its sources and supply are in our *own* hands—free from the fluctuations of foreign policies. Endless research by scientists and chemists working in the laboratories of the N.C.B. will ensure that coal will be increasingly profitable for its users.

DELIVERY—ON THE DOT —ON THE SPOT

The delivery of Industrial coal is today organised and completely reliable. Leading coal merchants have completely overhauled delivery and storage systems and are fully equipped to make sure that you get the right grade of coal when you want it and where you want it.

Furthermore, a completely mechanised handling system will transport coal from bunker to furnace without any manual labour at all.

FINANCE PLAN FOR INDUSTRY

No deposit, repayments spread over five years, and low interest charges that can be set against tax, full investment and other capital allowances that can be claimed at once—these are the terms available to the manufacturer or businessman who wants to install modern coal-burning equipment without touching his capital resources.

Make use of the National Coal Board Industrial Finance Plan. The loans are made by Forward Trust Limited, a member of the Midland Bank Group. A 'phone call or a letter to the regional office of the National Coal Board will bring you full details.

AND—WHEN YOU NEED IT—A NATION-WIDE FREE SERVICE

The vast resources of the National Coal Board are no further away than your telephone. At a flick of your finger, you can call upon one of the most comprehensive and efficient technical services in the world. No problem is too small or too big. You may want advice on coal quality, coal storage, coal-burning appliances or even on the siting of a boilerhouse. Whatever it is, a 'phone call or letter either to your coal supplier or to the regional office of the National Coal Board will bring an unbiased and authoritative answer to your problem.

SOLID FUEL—more heat at less cost—and it's British

PROGRESSIVE INDUSTRY IS GOING FORWARD ON COAL

ISSUED BY THE NATIONAL COAL BOARD

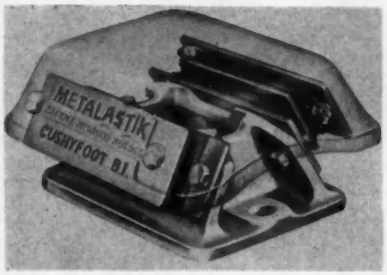


Fig. 3. (left) "Cushyfoot" mountings are loaded in shear and compression, a combination permitting large deflections with good load carrying capacity and maximum life

Fig. 5. (right) These ring-frames by Platt Bros. and Co. Ltd., are located on Andre textile machinery mountings. There are twenty-eight mountings under each frame. (courtesy: J. J. Hayes Ltd., Leigh, Lancs.)

Vibration in textile machinery, and their drives, can arise from rotary motion, reciprocating motion or impact; or a combination of two or more of these causes. Amelioration of the uncomfortable acoustic conditions encountered in many worksheds has been secured through attention to suppressional measures in the design of machines and their component parts. This work is enhanced by having resort to resilient machine mountings; which not only tend to reduce noise caused by vibration, but protect the machine itself to give longer working life and lessened maintenance, or to permit more accurate work, and less stoppages, through smoother running.

Examples of textile machines so mounted are illustrated in Figs. 1 and 2. The former shows a gill box by Prince-Smith and Stells Ltd., Keighley, located on "Cushyfoot" anti-vibration mountings and the latter, a tufting machine isolated by mountings of the same make and type; six mountings—one under each foot—are employed. These resilient units, one of which is now shown in Fig. 3, are produced by Metalistik Ltd., Leicester, in two standard sizes, but a wide range of loads, from 170 lb. to 3,500 lb. per mounting for ¼ in. deflection, can be catered for by using different rubbers and designs for the inserts.

Loading is in shear and compression, a combination permitting large deflections with good load carrying capacity and maximum life. The mounting cannot become "solid" and so rendered ineffective. It has also different stiffnesses in vertical, transverse and longitudinal directions; being more flexible to the horizontal load applied along its length than to the load applied transversely. Full advantage is taken of this characteristic by disposing the mounting so that the greater flexibility is available in the direction in which it is needed. When three or more mountings are arranged symmetrically around a vertical axis, the flexibility of the suspension is the same in all directions; a useful arrangement for hydro-extractors and similar machines. Protection of the rubber from oil and mechanical damage is given by a top cover; shown "ghosted" in Fig. 3.

Rubber Pads

As will be seen, the mounting illustrated is arranged for bolting to the work-floor and the machine or sub-frame to be mounted is bolted to the top cover of the mounting, so providing a positive location. This method of fixing may be eliminated in a large number of installations by the use of rubber friction pads which, fitted to the top and base of the mounting, locate the machine firmly and overcome any tendency to 'walk.' The pads are made in oil-resisting rubber and can be used on all kinds of floors. Where applicable, they simplify the work of machine installation, and also permit the easy movement of machines to meet the requirements of revised layout.

Fig. 4 shows a resilient unit designed for use with lighter machinery. It is the Metalastik "B" series mounting, a

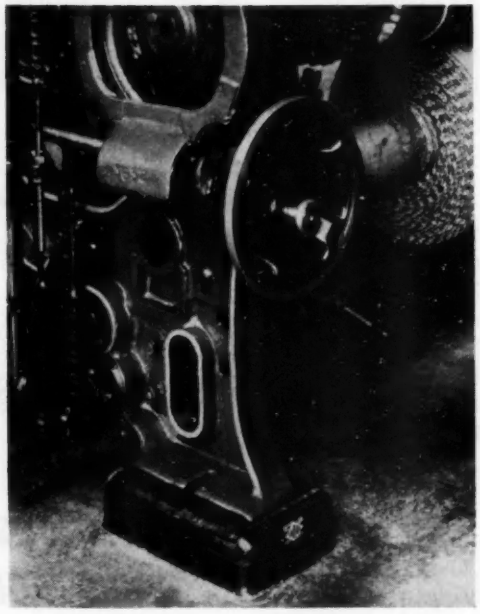


Fig. 6. (right). Foot and mounting for a Dobcross type loom. The Andre mounting is designed to grip the floor under the weight of the machine, without mechanical fixing

Fig. 4. (left). For lighter machinery, the "B" series mounting provides ample deflection for effective insulation against vibration with frequencies down to 700 c.p.m.

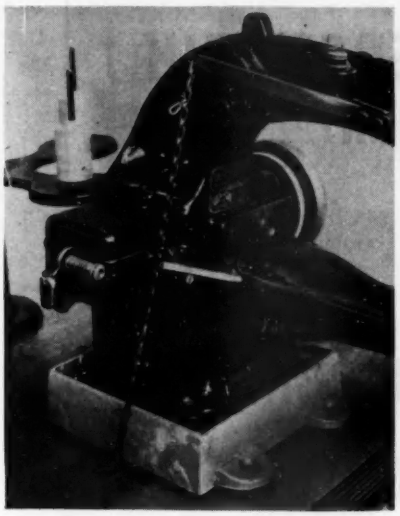


Fig. 7. Four Metalastik "Two-Bolt" instru-mountings, loaded in compression, are used to flexibly suspend this power-driven sewing machine. (courtesy: Messrs. Ater, Amsterdam, Holland.)

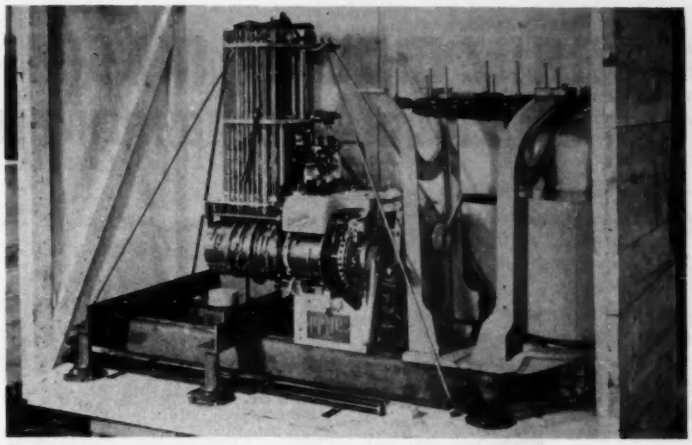


Fig. 8. Resilient mountings are often employed to protect machinery from vibration and shock in the factory and during transit. This "Komet" knitting machine (Bentley Engineering Co. Ltd., Leicester) is being packed for export

compact unit of low height providing ample deflection for insulation against vibration with frequencies down to 700 c.p.m. Four different sizes are made and supplied in four assemblies according to the method of application; giving a load range of from 10 to 800 lb. per mounting. Provision is here again made for positive location, but friction pads, as fitted to the mounting illustrated, simplify installation and re-siting of machinery without damage to floors.

No Fixing

The textile machinery mountings produced by Andre Rubber Co. Ltd., Surbiton, are also designed to locate machinery without any kind of fixing, as illustrated in Figs. 5 and 6. There are 28 mountings provided for each of the ringframes shown in Fig. 5; one under each of the 22 feet, four under the driving motor and two under the gear case. Fig. 6 illustrates clearly the method of installation. A recess in the top of the mounting takes the foot of the machine, whilst the base is provided with keying which grips the floor when under the machine. The mountings have channels to drain off oil which may run down the feet of the machine.

Under the weight of the machine the friction between the base of the mounting and the mill floor is sufficient to hold the machine in position without fixing of any kind. The mountings flex under the motion of the machine. Although slight this flexing is sufficient to absorb excessive vibration and actually increases the life of the mounting as rubber which can "work" under a load keeps its resilient qualities indefinitely.

The flexible mounting of very light machines, an application often permitting higher operating speeds and reducing breakdowns traceable to the effects of vibration, can be achieved in the manner shown in Fig. 7. This reproduced photograph illustrates a power-driven sewing machine mounted on Metalastik "Two Bolt" instru-mountings; loaded in compression. Designed to protect instruments and sensitive apparatus from vibration and shocks, and also suitable for mounting light machinery, each unit used represents an anti-vibration unit in its simplest form. It consists simply of two steel studs isolated by a cylinder of rubber to which they are bonded. Loading may be in compression, shear, or a combination of both, and each of the many sizes available is manufactured in three standard grades of rubber hardness so that a mounting of a particular size has a wide load/deflection range.

Although this short article is concerned with the use of resilient mountings to reduce the incidence of vibration arising from the operation of textile machinery, attention should be directed to the application illustrated in Fig. 8. It offers to manufacturers of textile machinery, particularly those engaged in the export trade, a means of protecting their products from vibration and shock; both in the factory and during transit. The machine illustrated, a "Komet" hosiery knitting machine produced by Bentley Engineering Co. Ltd., Leicester, is mounted in its packing case on six Metalastik Equi-frequency mountings. The machine thus "floats" inside the packing case and the risk of damage by rough handling is greatly reduced. A special study has been made of mounting machinery for transit and some of the units developed for this work give deflections up to 4 in.

New Zealand's Wool Production

New Zealand's greasy and scoured wool production reached 1,482,000 bales, almost 50,000 bales or 2½% more than in 1959-60 and total wool production for 1960-61 (greasy, scoured and slipe) reached 588 million pound a rise of 11 million pound or 2% on the previous season's record level. This was reported to the New Zealand Wool Board's annual electoral committee. Estimated clip value for 1960-61 is £99 million compared with £107 million in 1959-60. The clip has continued to show a coarsening trend and also an increase of short wools.

New Zealand's greasy wool clip for 1960-61 averaged 40.34d./lb.—4¼d. or 10% below the previous season's overall average price of 44.65d. The U.K. headed the list of importing countries, taking 4,821 hundred bales or 32% of total exports. France was New Zealand's second best customer with 2,641 hundred or 17% and the U.S. followed with 2,183 hundred or 14%, and West Germany with 1,052 hundred or 7%. The Soviet Union purchased 276 hundred bales—about 5,000 less than in the previous season. China bought 9,500 bales compared with 481 hundred bales in 1959-60.

FRANZ MÜLLER · MASCHINENFABRIK
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INTERNATIONAL KNITTING MACHINERY AND ACCESSORIES EXHIBITION

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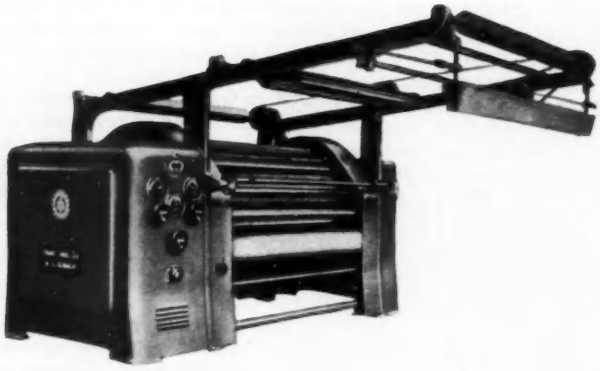


Sole Agents for the United Kingdom : G. W. THORNTON & SONS LTD., 10 Eden Place, Cheadle, Cheshire. Tel. GATley 4271 (3 lines)

Use of A.S.D. Spinning Frame for Nylon Staple*

THIS report deals with a series of trials to yield similar information for spinning 6 den. 4 - 6 in. nylon staple. Experimental yarns were spun to 20 w.c. (worsted count) from 6 den. 4 - 6 in. medium crimp, heat-set nylon staple. Prince-Smith and Stells recommend a roving twist factor of 4·2 for white crossbred wool rovings destined for A.S.D. spinning. They recommend a flume setting of 1·2 in. for 20 w.c. all-wool yarns.

As a scouting trial to define limits of roving twist, and to check drawing conditions, a series of 55 drams/40 yd. rovings were made on a machinery sequence consisting of Autoleveller gill box, Autoleveller draw box and a Bradford open draw box (normal second draw box, bobbin size 13×7 in.). The roving twist factors ranged from 1·7 to 3·0. No anti-static dressing or spinning lubricant was used, since neither had been found necessary when processing 3 den. 3 - 5 in. staple on this system.

Generally, poor spinning performances were obtained from these rovings, particularly from those with twist factors of 1·7 and 3·0. Spinning ratches of 7½, 8 and 8½ in. were used, the last giving better results than the other two. A new batch of rovings was made with twist factors of 1·8, 2·0, 2·2, 2·4, 2·6 and 2·8. They were produced on the same sequence of drawing, using conditions tabulated in Table 1. In an attempt to improve spinning performances, 2½% of a 30% solution of "Lissapol N" in water was sprayed on the slivers at the delivery end of the Autoleveller gill box.

Each roving was spun into four 20 w.c. yarns using a constant 8½ in. ratch, but with flume settings of 0·9, 1·0, 1·1 and 1·2 in. respectively. The yarns were tested for irregularity on a Fielden-Walker instrument at speeds of 5 and 50 ft./min. Samples of each yarn were wrapped on blackboards and assessed visually.

Tables 2 and 3 show (*a*) the results of irregularity tests and the visual assessment of the yarns, and (*b*) the average irregularity of all the yarns spun at each flume setting.

There was no statistically significant difference between the irregularities of any of the twenty-four yarns spun. Table 2 shows that, although apparently good yarns were spun from rovings with twist factors of 2·2, 2·4 and 2·8 using flume settings of 1·0, 0·9 and 1·1 respectively, the most consistently good yarns (assessed visually) were spun from rovings with a twist factor of 2·6.

Table 3 shows that, although, as previously stated, there was no significant difference between the irregularities of the yarns, there was a slight trend for irregularity to increase as the flume setting was widened.

Conclusions

(1) Measured yarn irregularity was unaffected by changes in roving twist factor in the range 1·8 to 2·8.

(2) With a roving twist factor above 2·8 spinning performance was poor.

(3) A roving twist factor of 2·6 produced the most consistently good yarns (visual assessment).

(4) An increase in the flume setting to 1·2 in. caused slight increase in yarn irregularity.

(5) A spinning ratch of 8½ in. was found to be satisfactory.

(6) The addition of an anti-static/lubricating dressing to the slivers during gilling was necessary in order to achieve satisfactory spinning performance.

(7) For practical guidance, the optimum conditions for spinning 20 w.c. yarn from a 55 dram/40 yd. roving of 6 den. 4 - 6 in. medium crimp, heat-set nylon staple were: roving twist factor 2·6, A.S.D. flume setting 0·9, spinning ratch 8½ in.

Table 1

	Autoleveller gill box	Autoleveller draw box	2nd open draw box
Doublings	12	1	4
Draft	5·5	7·0	7·3
Weight of end produced (drams/40 yd.)	700	100	55
Ratch (in.)	2¼*	8 (fixed)	8
			++

* The gill box ratch indicates the distance between the nip of the front rollers and the front fallers.

Table 3. Average Mean Deviation (%) of all Yarns Spun at each Flume Setting

Flume setting (in.)	0·9	1·0	1·1	1·2
Mean deviation measured at 5 ft./min.	8·2	8·4	8·6	9·0
" 50 ft./min.	13·9	14·5	15·1	15·1

Table 2. Results of Tests on Yarn Irregularity and Visual Assessment of the Yarns

Roving twist factor	1·8				2·0				2·2			
Flume setting (in.)	0·9	1·0	1·1	1·2	0·9	1·0	1·1	1·2	0·9	1·0	1·1	1·2
Yarn irregularity (mean deviation %) measured at 5 ft./min.	8·3	8·8	8·1	8·7	8·5	8·3	8·6	8·4	7·9	8·4	8·3	9·9
" 50 ft./min.	14·1	15·1	14·9	15·8	14·5	13·9	14·8	15·2	13·5	14·5	15·4	17·6
Visual assessment of yarn	Poor	Poor	Poor	Poor	Poor	Fair	Fair	Poor	Fair	Good	Fair/good	Fair
Roving twist factor	**2·4**				**2·6**				**2·8**			
Flume setting (in.)	**0·9**	**1·0**	**1·1**	**1·2**	**0·9**	**1·0**	**1·1**	**1·2**	**0·9**	**1·0**	**1·1**	**1·2**
Yarn irregularity (mean deviation %) measured at 5 ft./min.	8·2	8·1	9·0	9·4	8·0	8·4	9·0	9·0	8·4	8·1	8·4	8·5
" 50 ft./min.	13·3	14·3	15·4	16·3	13·6	14·9	15·8	15·3	14·3	14·0	14·2	15·4
Visual assessment of yarn	Good	Fair/good	Fair	Poor	Fair/good	Fair/good	Fair/good	Fair/good	Fair	Fair/good	Good	Fair

* *Advance Report, No.* 40 *from British Nylon Spinners Ltd.*

CUT HERE

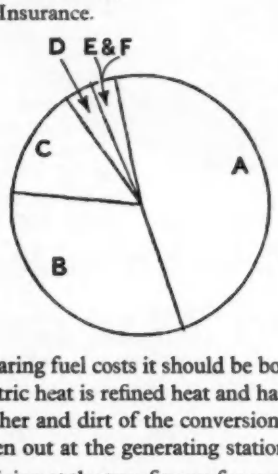
Factory Heating-1

The space heating of factories by electrical means can be achieved in a variety of ways which will be dealt with in the next Data Sheet.

Before deciding on any form of factory space heating—whether by means of electricity or not—it is as well to have clearly in mind all the components of the total annual running cost, and not merely the fuel cost, of the installation.

They are:

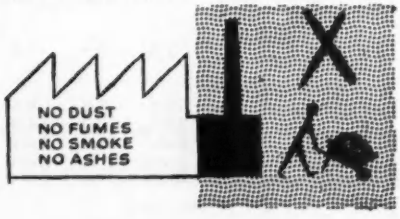
- **(A)** The cost of the fuel or the electricity,
- **(B)** Interest and depreciation on the capital cost of the installation,
- **(C)** Labour,
- **(D)** The cost of running auxiliary plant such as fans and pumps,
- **(E)** Maintenance,
- **(F)** Insurance.



In comparing fuel costs it should be borne in mind that electric heat is refined heat and has had all the fuss, bother and dirt of the conversion of fuel into heat taken out at the generating station.

In arriving at the true figures for capital cost and depreciation, maintenance, and insurance, those connected with such items as boilerhouse, chimney, fuel store and access road should be included; labour costs should include such tasks as ash disposal. None of these items occurs when electricity is used, although space will be required for the electric boiler and storage vessels in the case of the type (h) following.

Electricity provides the ideal answer to the requirements of the Clean Air Act, the impact of which has introduced an important new factor during the last few years.



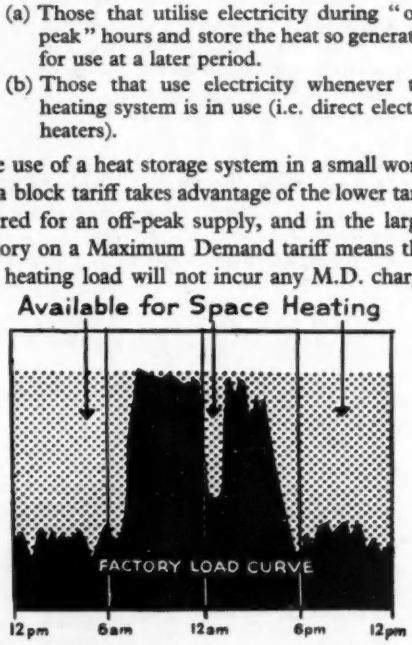
The following list gives the main types into which electric heating installations fall:

- (a) High temperature ("infra-red") overhead heaters operating at near red heat.
- (b) Medium temperature panels operating at surface temperatures of 400° to 600°F.
- (c) Extended surfaced heating in the shape of floorwarming operating at temperatures up to 80°F.
- (d) Oil and water filled radiators.
- (e) Tubular heaters.
- (f) Unit heaters.
- (g) Storage block heaters.
- (h) Electric boilers and water heaters operating in conjunction with hot water radiators or panels either with or without water storage.

All these methods of electric heating can be divided into two distinct classes:

- (a) Those that utilise electricity during "off-peak" hours and store the heat so generated for use at a later period.
- (b) Those that use electricity whenever the heating system is in use (i.e. direct electric heaters).

The use of a heat storage system in a small works on a block tariff takes advantage of the lower tariff offered for an off-peak supply, and in the larger factory on a Maximum Demand tariff means that the heating load will not incur any M.D. charge.



Alternatively there may be cases where the use of direct electric heaters can be integrated with other factory loads in such a way that they are not used during the factory peak periods and will thus incur no additional M.D. charge.

For further information, get in touch with your Electricity Board or write direct to the Electrical Development Association, 2 Savoy Hill, London, W.C.2.

Excellent reference books on the industrial and commercial uses of electricity and reprints of articles and papers are available. An example is "Higher Industrial Production with Electricity" (price 8/6 each or 9/- post free).

E.D.A. also have available on free loan in the U.K. a series of films on the industrial uses of electricity. Film and Book catalogues and Publications List sent on request.

14279

Reviews

PACKAGING DIRECTORY, 1961. The Tudor Press Ltd., 75 Carter Lane, London, E.C.4 (price 21*s*.).

Claimed to be the most comprehensive guide to all aspects of packaging in Europe, the contents in this new edition are divided into seven main divisions, sectionalised as required.

The index to the buyers' guide division starts with "Adhesives," and lists 88 types and ends with "Yeast-packaging Machines" with two entries. Over 800 main entries cover the remarkable number of different packaging materials. The buyers' directory is divided into four sections: containers and closures, materials, packaging machinery and equipment and services. The Containers and Closures lists 831 types with the manufacturers and original suppliers mentioned under each entry. The "Materials" Section has 656 items with the suppliers and manufacturers listed under each. Packaging Machinery and Equipment is a terrific array of 1,090 types of machinery and equipment for every conceivable aspect of one of the world's major industries. The "Services" section deals with such matters a air-freighting, artwork, block-making, carding, design consultants, die-cutting, electronic equipment maintenance, laminating, package and packaging-material testing, packaging consultants, machinery designers, many types of specialist packers, paper-treating, photographers, printers, shipping and forwarding agents, showcards, and transport services. A most comprehensive list of foreign firms with British agents gives the name and address of the firm, its products and the name and address, telephone number, etc., of the agents. About 250 foreign firms are listed. The final division lists over 2,750 names and addresses of all the firms, both manufacturers and suppliers, mentioned in the buyers' guide division.

A.D.

* * *

DICTIONARY OF DYEING AND TEXTILE PRINTING. By H. Blackshaw and R. Brightman. George Newnes Ltd., Tower House, Southampton St., London, W.C.2. (price 30*s*.).

Ability, it has been said, is most admired when it sparkles in the setting of modesty. Nowhere in this exceptionally good dictionary do the compilers parade their unexceptionable qualifications for the work they undertook and it remains, therefore, for this reviewer to say something of their background. Mr. Blackshaw (I.C.I. Ltd.) is a member of the Society of Dyers and Colourists Publications Committee and served on the Colour Index Panel, being co-ordinator for several years.

Mr. Brightman, now enjoying a busy retirement from his labours with the same company, can look back on a career as, successively, research chemist, librarian, bibliographer, reviewer and regular contributor to "Nature". Their 225-page dictionary provides concise definitions accompanied, where appropriate, by drawings, diagrams and formulae, which will be helpful to specialist and non-specialist alike engaged in the dyeing and printing industries. Textile terms apart from those having particular significance to the dyer and printer have been excluded. Similarly only such chemical terms as are encountered in dyeing and printing or are difficult to trace in chemical dictionaries are included.

There are two other particluarly useful features, namely an appendix listing those man-made fibres which have assumed commercial importance and a short reading list for the use of students and trainees, of the books and periodicals most likely to aid them in further studies.

The dictionary admirably fulfils its purpose of furnishing an up-to-date glossary for those concerned with the application of colour to textiles and can be wholeheartedly recommended.

S.P.S.

* * *

DYEING OF CELLULOSIC FIBRES. By S. R. Cockett and K. A. Hilton. Leonard Hill Ltd., Eden Street, London, N.W.1. 1961, (price 50*s*.).

Amidst many publications (and publicity) on man-made fibres it is refreshing to welcome a new book on dyeing cellulosic fibres, as cotton and regenerated cellulosic fibres still constitute the main proportion of fibres processed, dyed and finished. After explaining the chemistry of cellulose and cellulose fibres and their preparation before dyeing, there is a section on light, colour and chromatography, and on the relation between colour and chemical constitution. More than 70 pages are devoted to the chemistry of dyes; one wonders if the authors could not have shortened this chapter as there are other extensive textbooks on dyestuff chemistry and on physical chemistry of dyeing available.

Chapter 6 in effect constitutes the core (and aim) of the book: dyeing. First, theoretical considerations, the purpose and achievements of dyeing, dyeing theories, this is followed by sections on the application of colorants, dyeing processes and techniques, and on continuous dyeing methods. An instructive description is included with illustrations on modern dyeing machines, the Barotor, du Pont booster, high pressure dyeing machines and other recent developments in dyeing machinery. Mechanical, chemical and permanent finishes are also explained and there is an appendix on bast fibres. Planning such a book could not have been an easy task and if it gives an impression of lacking conformity in certain parts the authors must be highly complimented on the authoritative and competent manner in which they have completed an admirable work. The book should be read and studied by students, research workers and by all technologists concerned with this section of the textile industry.

B.S.

COLOURING IN FACTORIES. Factory Building Studies No. 8, published for D.S.I.R. by H.M.S.O. (price 7*s*. 6*d*.).

Colour in industry is not merely a form of decoration or even a "welfare" measure. It has certain functions to perform and the factors that are important for practical success have been established. The latest report in the Factory Building Studies series, based on several years' work on the use of colour in various types of building, is a concise guide for factory managements and their architects or colour consultants. It has two sections, both containing coloured illustrations. The first section describes the basic properties and effects of colours, linking them with certain facts about human eye-sight, to form general principles for colour design. The second section explains the practical application of these principles.

* * *

GANZSTAHL-ODER FLEXIBLE KARDENGARNITUREN IN DER BAUMWOLLSPINNEREI. (Rigid or flexible cards in fine cotton spinning.) By Dr. A. Zwicky. Verlag Leemann, Zurich. 1961 (price Sw. Fr. 20).

This monograph is actually a report on research work carried out at Zurich Technical University, Department for Textile Machinery construction and Textile Industry (Prof. Dr. E. Honegger), According to the author, opinions on the efficiency of rigid cards have been divided ever since these were introduced in 1922. The conclusions drawn in this book are based on academic research as well as on work under industrial working conditions. The efficiency of the cards is judged by the amount of impurities left in the sliver, and this is evidenced in the monograph by innumerable tables and statistics. Maintenance of the cards was also investigated in view of a legend that rigid cards do not require sharpening.

In general, one can say that carding efficiency is a function not only of the type of card but also of the rate of carding. At speeds up to 4 kg./hour the rigid cards were superior to the flexible cards but at greater speeds the trend was reversed. The fact that flexible cards required more frequent sharpening was, according to the author, not due to increased wear but was caused by occasional displacement of teeth which could no longer return to their original position. Semi-rigid flats were definitely superior to flexible ones and more economical.

B.S.

* * *

INDEX DES HUILES SULFONEES ET DETERGENTS MODERNES. By J. P. Sisley. Third volume. Editions Teintex, Paris. 1961. 560 p. (price NF.80).

The third volume of this encyclopedia of surface-active agents is a notable addition to the previous editions published in 1949 and 1954. It surveys development and progress in the manufacture and production of such products, and lists 2,000 new products which appeared on the industrial market between 1954 and 1960. The author includes a system of classification by which every variety of surface-active agent can be identified, and groups them into classes according to the chemical composition. In the second part of the book products are listed in alphabetical order, giving chemical class, properties, appearance and application. This encyclopedia is a welcome addition to existing literature.

B.S.

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COMPREHENSIVE GUIDE TO FACTORY LAW. By R. McKown. Chantry Publications Ltd., 63 Neal Street, London, W.C.2 (price 25*s*., postage 1*s*. 3d.).

First published in 1954 the revised edition of this extremely valuable book includes the requirements laid down in nearly a dozen different Acts of Parliament and more than two hundred Statutory Instruments, Certificates of Exemption, etc., arranged and indexed according to subject, so that the enquirer can see in a minute or two exactly what the law requires in any particular matter. Reference is also made to High Court decisions which have cleared up doubtful points, e.g., whether a canteen is subject to the Factories Acts and whether the requirements for the ventilation of workrooms apply to a boilerhouse.

The new edition has been revised to include the provisions of the 1959 Factories Act, the Clean Air Act, the Thermal Insulation Regulations, and other recent legislation, including the latest Food Hygiene Regulations. A supplement supplied in the form of a loose sheet inserted in the book anticipates the new Factories Act which comes into operation next April and which, without changing the law in any way, will alter the section numbers under which many of the requirements are made; this supplement shows the section numbers of the present Acts and the numbers of the sections covering the same requirements in the new Act. As in the original edition, a special chapter has been devoted to the responsibilities imposed on the factory occupier by Common Law. These requirements are wider in scope and more general in character than the requirements of the Factories Acts and in order to meet them the occupier will frequently need the sort of guidance that this book gives.

A.L.F.

* * *

INDEX OF PRODUCTS. Aluminium Development Association, 33 Grosvenor Street, London, W.1.

This publication is now divided into two parts, the first being an index of products whereby a user of aluminium requiring it in a particular form—e.g. castings, sheet, foil, sections, wire—is given on sight the names of member companies supplying aluminium in that form and is referred by page number to the second part of the book on which the full particulars (name, address, sales offices, etc.) of corresponding member companies are set out. The directory, in revision, has been addressed with the needs of the user and prospective user of aluminium very much in mind in order to give him the fullest possible information. Copies are available without charge from bona fide enquirers.

* * *

TROCKENSPINNVERFAHREN FUER LEINENGARNE UND EINSATZ TROCKEN GESPONNENER GARNE IN DER LEINENWEBEREI (Dry Spinning Methods for Linen Yarn and Use of Dry-Spun Yarns in Weaving Linen). By W. Rohs, R. Otto and H. Griese. Westdeutscher Verlag Koeln and Opladen. 1960. Report No. 937. Tj. 56. Dm. 18.80.

This monograph explores the possibility of replacing wet spinning by dry spinning of linen yarn because the latter is more economical. Equal yarns were spun on three systems, namely wet spinning, gill dry spinning and "Perfect" dry-spinning. Checks were made on the passage of the yarn through the machines and on the efficiency of the machines. The yarns themselves were tested in the grey and in the bleached state. Finally, the yarns were used as weft in various fabric constructions and checks made on the weaving efficiency. The fabrics were examined for strength, extensibility, absorbency, air permeability, appearance after finishing and after twenty-five launderings.

On the whole, it was confirmed that wet spun yarn has higher strength, is more even and smoother than dry spun yarn. After bleaching these differences were less pronounced. Little if any differences were found in the behaviour of the yarns during coning and weaving. Plain fabrics showed clearly the superiority of wet spun yarn but with the rougher type of fabric, e.g. huckaback, the difference was hardly noticeable. Dry-spun yarn gave the fabrics better air-permeability and absorbency. Tensile strength of the fabric made from dry-spun yarn was equal to that made from wet-spun yarn when tested dry but superior when tested wet. After twenty-five launderings the tensile strength of the fabrics made from dry-spun yarn was superior even when tested dry.

B.S.

* * *

EINFLUSS DES BUGELNS MIT DER HOFFMANN-PRESSE AUF EINIGE EIGENSCHAFTEN DER WOLLE. By Dr. G. Satlow and Dr. T. Gerthsen. Westdeutscher Verlag Köln and Opladen. Report No. 940. 1960. pp.45.

This investigation was prompted by conflicting statements about damaging effects of Hoffmann pressing on wool. Fabrics finished in the conventional manner and by the Si-Ro-Set process using ammonium thiohlycollate were used. Chemical tests included cystine content, alkali solubility, solubility in urea bisulphite, etc. Physical tests comprised tear strength and extension of break. Microscopical tests were also made.

It was found that the changes in ordinary wool fabrics as a consequence of Hoffmann pressing were so small that they are statistically insignificant. Wool pre-treated by the Si-Ro-Set process showed however changes which indicate a slight degradation. Cystine content and alkali solubility increases; acid solubility reaches values up to 15% which is considered too high.

The changes in chemical data are however not reflected in the physical tests. Tear strength and extension at break remain more or less the same. The authors conclude that, as a result of their investigations, Hoffmann pressing has no deleterious effect on wool. Wool pretreated with ammonium glycollate shows after ironing and prolonged steaming certain changes of the chemical data which has, in the opinion of the authors, no damaging effect on wool.

B.S.

* * *

UNTERSUCHUNGEN UBER DEN ABLAUF DER ARBEITSVORGANGE BEI SCHLAGMASCHINEN IN BAUMWOLL-UND ZELLWOLLAUFBEREITUNGSANLAGEN (Investigations carried out on scutchers in treating of cotton and staple fibre). By H. Stein and M. Eidelsburger. Westdeutscher Verlag Köln and Opladen. Report No. 847. 1960. pp.54. (price DM. 16.70).

The work of the scutcher and transportation of material from feeder to lap are discussed. It is possible to control the mode of working indirectly through subsequent testing of the laps produced on the scutcher. For this purpose testing devices working on high frequency principles are used and a testing device recommended by the Institute for Textile Measurement Techniques (M. Gladbach, Germany) is described in detail, It scans the evenness of the lap mechanically and registers the results by means of an electrical device. In addition, the electrical mechanism can also be operated by the so-called "Masing" evaluator which enables the determination of the coefficient of variation and gives definite values for the unevenness of laps prepared under varying conditions. Details are given of the examination of the effect of the fibre and of the various installations for the transport of the material through the scutcher on the evenness of the lap. Weighting of the pressure rollers has little effect on evenness but one can alter the thickness of the lap by varying the roller pressure.

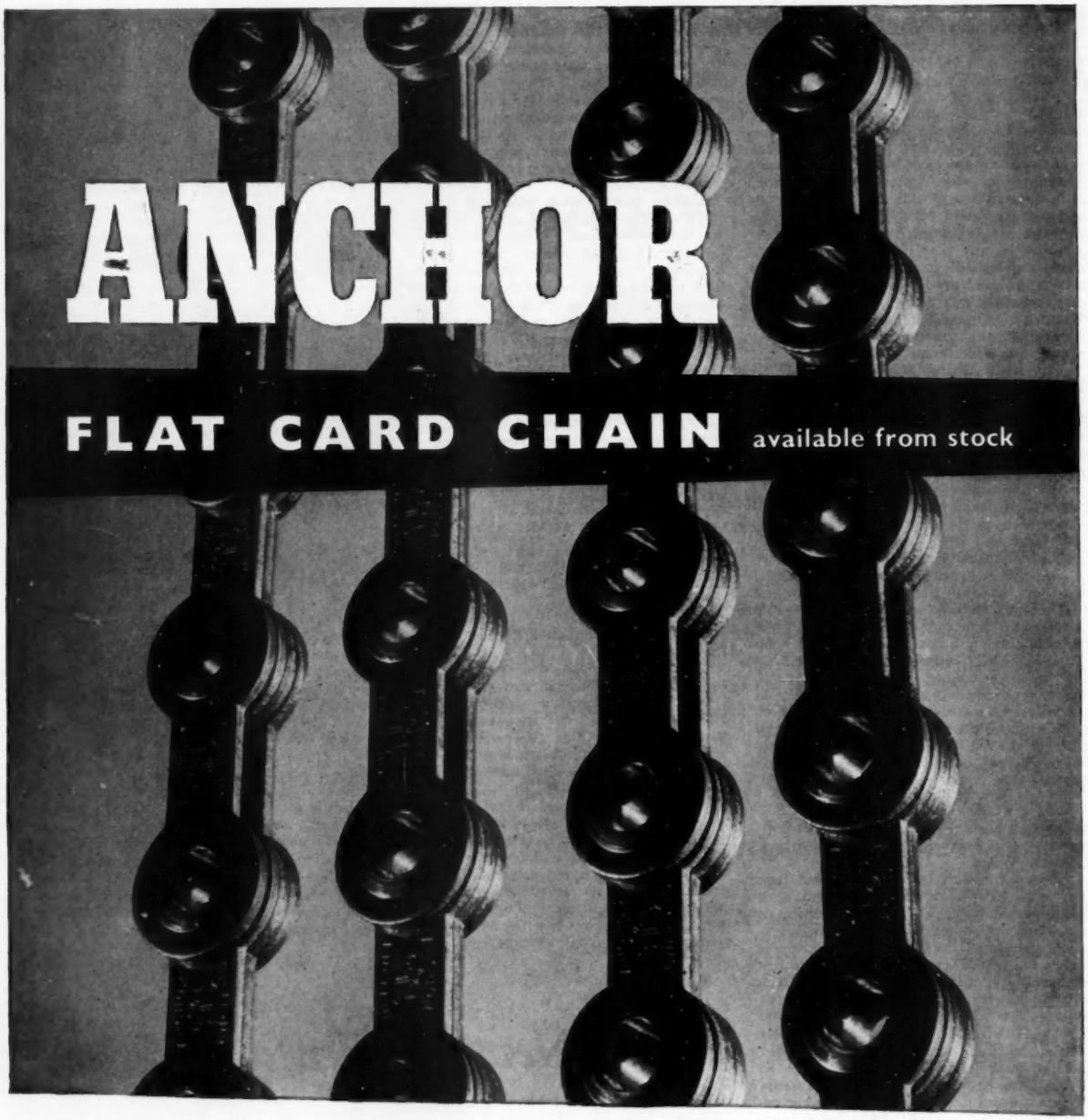
B.S.

New Publications

HEAT TRANSFER MEDIUM. A new publication from I.C.I. Ltd., Millbank, London, S.W.1, gives concise information concerning "Thermex"—the I.C.I. brand of the eutectic mixture of diphenyl oxide and diphenyl—a mixture well-known for its value as a heat-transfer medium. "Thermex", it is pointed out, is eminently suitable for this type of application at temperatures up to 400°C. Highly desirable properties open up a wide field of uses for liquid-phase and vapour-phase heating and cooling in a variety of industrial processes, including melting and spinning synthetic fibres, processing fats and vegetable oils, etc., plastics and rubber products.

* * *

MOTOR CONTROL CENTRE. Since General Electric Co. Ltd. marketed its motor control centre some three years ago many improvements have been incorporated based on service experience. For example the range of control gear which can be accommodated has been extended to include starters up to 150 h.p. and switch-fuses up to 200 A with no increase in the overall size of the cubicle. A duplex design for installations where floor space is at a premium has also been introduced. In the duplex cubicle the starter trays are mounted on both fronts with a saving of space of 6 in. over two single-fronted cubicles mounted back-to-back. Technical Description No. 445 which describes this class of switchgear has been completely revised and copies are obtainable from the company's Witton Publicity Department, Birmingham 6.



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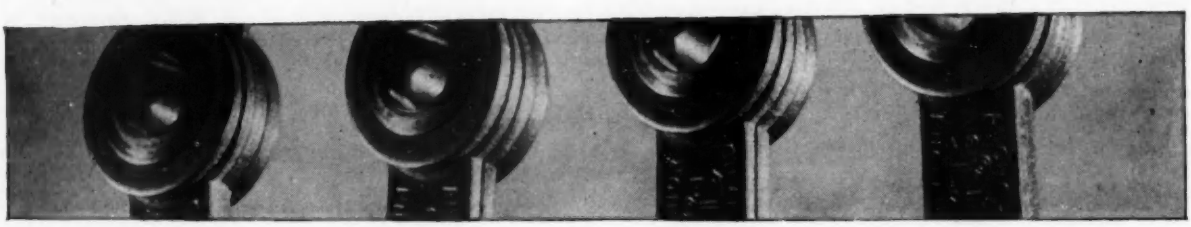

Textile Trade and Prospects

Quiet Demand for Lancashire Products

Poor trading conditions have not been helped by the general international situation, the Hong Kong uncertainties, and tension over the Berlin crisis. Most spinners and manufacturers have been seriously affected by the considerably reduced volume of orders and interested inquiry. Although delivery dates are infinitely better a large proportion of traders lack the necessary confidence to take advantage of this. This has resulted in some mills resorting to a four-day week, sufficient to keep pace with the low demand without incurring the risk of running too much to stock. In some cases, the poor turnover has compelled a few concerns to temporarily suspend evening shifts so that full-time day work will not be affected; these moves, as might be expected, have given rise to some resentment by operatives on these "housewife," etc. shifts. Events like this react very unfavourably because they inspire no confidence in either the management or the future of the industry. Scrapping redundant machinery has not removed the canker of lost markets at home or overseas. The complete solution demands much clearer thinking than was seen in the wholesale elimination of productive capacity. British textiles, in general, are still the best in the world but they need selling by the most vigorous methods imaginable and this is equally true for home or overseas markets.

Very little buying interest has been noticed in any direction. Modest weights of condenser types were booked and the off-take in coarse and medium American-type yarns has been extremely disappointing. What few orders were put through were mainly in standard weaving qualities on cop, cone and ring beams. A few specialities—blended staples and fancy yarns—were in good request, and more interest was shown in one or two lines of fine, combed counts. Hosiery qualities have met with poor support, probably a reflection—quickly transferred back—from a reduction in wholesale and retail turnover this summer.

Adequacy of present stocks in cloth and garments has created much the same sort of problems in manufacturing circles. Only a small amount of business has been negotiated. Some lines of apparel cloths attracted mild interest but few firm orders resulted. Although margins in many cases have been scaled down to keep machinery and output moving satisfactorily, the response has been poor. Bids, in many cases, have been below the cost of production. Orders for one or two lining fabrics were put through but customers have not been anxious to risk buying for more than immediate needs. The same cautious approach has dominated the situation in regard to household textiles. Merchants and multiple stores have not been as active to replace stocks of shirtings, towels and other terry cloths, and with some of the cheaper qualities, it has been virtually impossible to persuade anyone to buy. In furnishing fabrics, very modest volumes of dobby and jacquard cloths in the medium-price brackets have been sold. Printed qualities in traditional and contemporary styles have moved slowly and the greatly reduced demand has not conformed to any recognisable pattern. Export business still remains at pathetic levels. There seems little or no urge to get to grips with some of these problems and an atmosphere of stagnation pervades all trading activities.

Wool Production and Consumption

At the recent wool marketing season for 1961 - 62 in Australia and South Africa, Australia offered a clip provisionally estimated at 4,849,000 bales, slightly larger than the estimate for the previous season and by far the biggest in the world. In the first week of the season, offerings at auction were 165,000 bales—65,000 in Sydney, 60,000 in Melbourne and 40,000 in Freemantle. As the prolonged drought in the Karroo—South Africa's main wool-growing area—has been broken, the South African Wool Commission expect a "brighter, healthier and more reliable clip" in the new season. Shorn wool production should be about 304 million lb., 9 million lb. more than in 1960 - 61. The major selling programme in New Zealand does not open until October. Commercial opinion in the principal importing countries is that the season opens under conditions favouring healthy demand. World wool consumption, which showed a slight decline during part of 1960, reversed the trend in the early months of this year, and statistics show that last season's clips have moved steadily into consumption, paving the way for the new clips. In the U.K., which consumes more wool than any other country, usage in the first half of 1961 was only 3% below the high level ruling in the first six months of last year, and commercially-held stocks are not big for the beginning of a new wool season. Japan, largest buyer of Australian wool last season, has announced a buying programme for the period up to March next year which promises a continuation of her recent rate of purchase. Demand for wool from Continental European countries is expected to be good.

Britain was again the main buyer of South African wool in the past season, taking 51·1 million lb. of greasy and scoured wool. Next was France, with 48·9 million lb., followed by Germany (40·4), U.S.A. (33·8), Italy (30·6) and Japan (14·4). These countries were also the leading buyers—in the same order in the previous season. For the first time since 1954 Russia did not buy any wool in the South African market.

Increases of 3% in the rate of top production, of 1% in worsted yarn deliveries and of 6% in wool fabric deliveries during June, compared with May, are shown by recent U.K. wool textile output figures of the Wool Industry Bureau of Statistics. Total wool consumption during June was slightly lower than in May, an increase of 2% in consumption for topmaking purposes being more than offset by a reduction in wool usage on woollen trade account. Compared with a year ago, all principal production sections showed increases. Advances were 2% in wool consumption, 7% in topmaking, 5% in worsted yarn deliveries, and 1% in wool fabric deliveries. June production figures were: wool consumption, 45·0 million lb. (clean); top production, 30·94 million lb.; tops drawn, 19·99 million lb.; worsted yarns delivered, 22·38 million lb.; woven fabrics delivered, 32·77 million sq. yds.; blankets delivered, 2·47 million sq. yds.

Linen Trade Review

Experience has shown that Governmental plans for economic rehabilitation have proved little more than stimulants which have failed to achieve the results necessary for permanent economic recovery, and it seems certain that the latest edition will prove no more effective. Industrialists are becoming increasingly aware that the solution of the problem—so far as it concerns them—demands more detailed knowledge and experience than has hitherto been brought to bear on it by Government planners. Also an independent approach is free of the strings and impediments invariably attached to Government aid.

The linen industry is no exception, and a greater display of that sturdy independence formerly characteristic of it would point the path to progress more effectively than appeals for Government help and protection in every emergency. This is true particularly of the wet spun section which, with the passing of the post-war sellers' market, has met increasing competition from other sections of the textile industry in its traditional markets. While over £16 million—much of it represented by Government aid—has been expended by the N. Ireland section on re-equipment in recent years, this has failed to stem the decline of over 50% in productive capacity, and which has taken toll of many of the re-equipped mills. Similarly—as the recent *Review of the Linen Industry*, compiled by the N. Ireland Ministry of Commerce, relates—domestic production of dam retted flax declined from 4,000 tons in 1951 to a nominal 40 in 1960, despite payment of a Government subsidy totalling £828,000 over the decade, averaging approximately £47 per ton of fibre produced.

Analysis of production figures for the N. Ireland industry over the past decade indicates that, while the general trend has been downward, this does not explain the very substantial contraction in spindleage over the period. The difference obviously represents redundant capacity which could well have been scrapped in pre-war years, being too fine for use in the emergency. Consequently a substantial percentage of the contraction effected recently does not represent the post-war decline in demand.

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There is considerable difference of opinion in the industry regarding the consequences of Britain's entry to the Common Market. The majority view is that while the immediate effect would almost certainly be unfavourable, the challenge presented would constitute a stimulant for more positive approach to its immediate problems. The home market has become the British linen industry's most important source of revenue, absorbing over 50% of output. Future prosperity will be determined by ability to adjust to the requirements and competitive forces of the countries with which Britain forms an economic alliance. The British linen industry possesses by far the largest percentage manufacturing capacity in the E.F.T.A., and consequently has extended its scope for expansion in this area. While entry to E.E.C. would ensure a more extensive consumer market it would also bring British manufacturers into more direct competition with those centres of production in France and Belgium which are located at the raw material source, and are also more favourably situated for distribution of their end products. These initial advantages can only be matched by economies in production cost in British mills, and on a scale that will demand fundamental changes in traditional manufacturing practice.

While authentic figures are not available regarding the fibre flax crop area in West Europe estimates put it at not less than last year, with higher yields anticipated for the current season due to more favourable conditions during growth and harvesting. Priority is being given to post-harvesting operations and a build-up of stocks of retted straw while the weather is favourable. Consequently output from the scutch mills is small and the selection poor, with low grade fibre predominating. No information is to hand yet regarding the approximate export surplus of fibre from the U.S.S.R. In any case the experience of recent years has stressed the uncertainty of this source, so that the dry spun section is now also drawing its main supplies from West European markets.

Manufacturers report an increasing volume of inquiries in recent weeks, with some useful business transacted. Stocks in merchants' and retailers' hands are low, and even a moderate buying movement in the consumer market would quickly bring much idle machinery back into production.

Jute Fibre, Yarn and Fabrics

The raw jute market has fluctuated within narrow limits of late, the most noticeable feature being the tendency for prices of the lower qualities to decline and for the better qualities to rise. This is due to the nature of the crop but no doubt some improvement will take place later in the season. Although a portion of the crop was sown earlier than usual and harvesting of this portion took place earlier, this did not produce the quality of fibre expected. As a result of this, a scarcity of fibre developed early in the season as some substantial sales had taken place for August shipment.

So far the Pakistan authorities have been able to maintain fairly high prices for their "golden" fibre and E.P.C. values are now in force covering the next three months. However, most sellers are willing to discount these official rates especially for the September and October positions. Reports regarding the crop continue to be satisfactory and there is every reason to assume that sufficient fibre will be produced to meet world requirements. However, it is not expected that any surplus will accumulate during the next few months and prices should not alter a great deal from their present levels.

Spinners in Dundee have shown only a small interest in new crop material and have only purchased sufficient to maintain their present raw material stock position. No bulk buying has taken place and it is possible that this type of purchasing will continue for some time. The fact that sellers are willing to discount the market for forward shipment is not attracting buyers as they feel lower rates will come into force once the full weight of the crop comes on the market. On the other hand, the mills in Pakistan are now large consumers of raw jute and this can prevent stocks from accumulating and weakening the market.

Offers are being made at £147 for Mill Lightnings, at £132 for Mill Hearts and at £121 for grade Hearts, c.i.f. U.K., for August shipment, at £142, £125 and £116 September and at £137, £120 and £114 October. Values of Mill Firsts and higher grades of white jute are nominal in the absence of offers. Offers of dark jute are now being more freely made with grade Tossa-2/3 at £141, grade Tossa-4 at £132 and Continental Tossa-2/3 at £126, c.i.f. U.K., for October shipment, and less would be accepted for shipment a month further ahead. Cuttings are available at £74 for N.C. September and at £64 October.

Since the start of the season two sets of E.P.C. values have been in force. One covered the current shipment period and the other was for shipment three months ahead and the official rates were much lower for the forward position. However, only one set is now in force and it has been stated that after August 15, these official rates will not include 2% commission. Arrivals of new crop fibre are awaited in Dundee to compare the quality with previous crops. Early season reports indicated that high grade fibre was scarce but some improvement is now taking place. Practically no spot jute is now available in Dundee as the bulk of this has been taken up by Continental spinners and some very high prices have been paid for these near-at-hand supplies during the past months.

The Calcutta goods market after being firm and advancing had a substantial fall during the second week in August. The main reason for this appeared to be that the Indian mills had been refused any further block closures to conserve raw material stocks. Various requests had been made to the Government but these were refused and it is now left to the mills to maintain production at as high a level as raw material supplies will allow. Prices are at 75/6 for 10 oz. 40 in., and at 60/9 for 7½ oz. per 100 yards F.O.B. Calcutta for August shipment, at 75/- and 59/- September and at 70/6 and 53/6 October/December. B twills were at 226/6, 223/3 and 206/6 for the respective shipment periods.

Demand for yarns and cloth at Dundee has been limited for some time and a fair amount of short time working was in force during the second quarter of the year. This resulted in considerably less raw material being consumed which at the present high price, has helped some spinners to remain out of the market. Yarn and cloth prices have been kept strictly in line with raw material costs and generally buyers have only covered their requirements a short distance ahead. This type of buying may continue for some time as most descriptions of yarns and cloth can still be obtained for reasonably early delivery. The heavy end of the trade has received some fairly substantial orders of late and in the case of narrow sacking producers are now very much better placed. However, there is still idle machinery in most departments and it is hoped that the normal Autumn demand will improve matters.

Silk and Man-Made Fibres

In certain sections of the Lancashire trade some short time working is causing concern and many spinners and manufacturers are equally worried upon the outcome of the Hong Kong imports. A further twelve months' grace would, it is felt, give a breathing space at least for re-orientation of the position especially in view of developments in Europe. There is considerable conjecture about the European negotiations and there are few who do not feel that eventually Britain will enter the Common Market.

The poor summer has resulted in stocks building up on retailers' hands, and short of an "Indian Summer" it is thought there is little chance of clearance. But an Indian Summer would be a mixed blessing, because then autumn repeat deliveries would be in arrears or unlikely. In furnishing fabrics, there is plenty of interest in viscose and acetate, but on the whole the outlook for Lancashire is not very optimistic at the moment. Blends of "Tricel" and "Fibro" remain a quite bright spot. Although limited, reports about such blends are so encouraging that a good future seems assured. The knitted jersey fabric trade has shown plenty of interest in spun-dyed rayon staple.

In the Yorkshire trade, lining manufacturers report steady demand well into the future. Styles vary, but generally the demand is equally spread over broad and narrow types. Linings with colour-woven stripes are in keen request as well as those with bold self-colours. C.F. acetate is popular in the field of linings and so is filament viscose.

Wool/"Terylene" blends and wool/acrylic blends find plenty of support in the suitings trade. The off-take of rayon staple by both woollen and worsted spinners is not quite as steady as it was earlier in the year, but a reasonable volume of production continues.

In the Leek area the somewhat gloomy picture of a month ago has not been alleviated. Thread manufacturers report continuing steady conditions with a regular call for blends of cotton/"Terylene." Makers-up are active with the almost phenomenal demand which exists for nylon lingerie and negligée.

A complaint fairly prevalent now by warp knitters, not only in the Leek/Macclesfield areas, but in Yorkshire, Lancashire and Derbyshire, are the poor margins on some locknit qualities. So fierce has the competition become that the business has been described as little more or less than a rat race.

Demand for Bri-Nylon in the Macclesfield area is particularly good. The demand for raised warp knit fabrics is distinctly encouraging and knitters are hard pressed to keep supplies to delivery dates. A considerable volume of these raised fabrics is for lingerie but developments taking place to produce a multi-bar warp knit machine are indicative of big developments in warp-knit fabrics for outerwear, especially in the men's trade.

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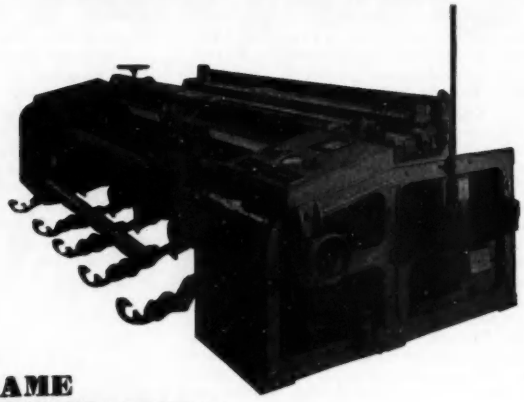
Lockheed Hydraulics enable constant pressure to be applied to beam rollers, from nothing to 1,000 lbs. per square inch, each side controlled independently. Constant Peripheral Beaming Speed throughout entire range of beam, from 6" diam. barrel to 36" diam. flange, at three different speeds. Totally enclosed oil immersed Constant Speed H-Gear Unit. Warp Length guaranteed. Machine automatically cuts out at any pre-set yardage for any number of beams until re-set.



Tube frame threaded with the spool in its spring holders: eliminates four operations (patents pending). Needles are brought forward by simple foot operated switch, leaving operatives' hands free to attend to interrupted ends and return to thread by the same operation. Tube frames can be threaded as fast as removed from the chain, thus facilitating immediate return to their last position in the chain. All needles have rounded crochet hook ends, preventing yarn damage and enabling smoother threading. All spool end strive difficulties overcome enabling, 100W threading even if strive is as much as 1" by our new full length comb. By fitting side supports the standard 4/4 machine can thread 2/4 to 16/4 Tube frames, or a machine can be supplied 12/4 in width. Tube Frame automatically clamped eliminating still a further hand operation.

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Notes and News

Extensive Re-equipment Programme

The well-known wool textile group, Illingworth, Morris and Co. Ltd. and Salts (Saltaire) Ltd., have embarked on an extensive plant replacement programme. As part of that programme, substantial orders for the latest types of drawing, spinning and twisting machinery have been placed with Prince-Smith and Stells Ltd. for installation in various mills of the group. The whole of this plant will be manufactured in Keighley.

* * *

Lancashire Machinery for Russia

A repeat order from Russia valued at £80,000 has been received by Hunt and Moscrop Ltd. Middleton, Lancs., for their "Evaset" shrinking machines. Representing some of the latest developments in this class of machinery, these high speed units will accept cloth up to 65 ins. wide. The "Evaset" plant is a complete unit embodying wash testing equipment and conditioning and shrinking machinery.

* * *

T.I. Annual Meeting

Bradford has been chosen as the venue for the Annual General Meeting of the Textile Institute, to be held in April, 1962.

* * *

"Terylene" Conveyor Belting

The photograph below shows "Terylene" reinforced conveyor belting, made by Leyland and Birmingham Rubber Co. Ltd., in use at Bickershaw Colliery, Leigh, Lancs. The particular location at Bickershaw Colliery is a gate conveyor in a section of the pit where rock falls and shifting of the conveyor alignment due to old workings are common. Despite this substantially the same belt has been running for over 12 months. "Terylene" reinforced belts are now used in widely varied conditions—from 14 ply 2 metre-wide belting capable of transmitting 2,000 h.p., used in the U.S.S.R. for conveying iron and non-ferrous ores, to belting for conveying gravel.

U.K. Reply to U.S.A. Appeal for Protection

Britain's wool textile industry has submitted a written brief in reply to a petition from American textile interests claiming that imports are threatening America's national security. Both documents were filed with the U.S. Office of Civil and Defence Mobilisation. The brief, submitted by the Wool Textile Delegation and the Wool Textile Export Group, supported by Scottish and West of England manufacturers, points out that America's wool textile industry is now protected by a 38% *ad valorem* duty, coupled with a specific duty of 37½ cents per lb., by far the highest wool cloth tariff for any developed country in the world. It is contended that the "harsh" increase in duty last January from 25 to 38% would not have been necessary but for disruptive imports from Japan. Among other points, attention is drawn to the large inroads which Japan has made in America's wool cloth market in recent years.

* * *

Flame Resistant Latex Foam

Research work now in its final stages at the Natural Rubber Producers' Research Association laboratories at Welwyn Garden City may result in the development of a commercial technique for manufacturing flame-resistant foam from natural rubber latex. In a progress report on this work entitled "A New Method of Increasing the Flame Resistance of Natural Rubber" (Rubber Developments, the Natural Rubber Bureau's quarterly journal), Mr. T. D. Pendle, who is in charge of the project, states that the new type of flame-resistant foam represents a "new approach" to this problem which involves the chemical modification of natural rubber so that flame resistance is "built into the rubber molecule." The product has "an appreciably higher load bearing capacity" than control samples of ordinary latex foam, and though in other properties it is not quite the equal of standard latex foam, it is stated that the "percentage loss of modulus after compression flexing and compression set should be quite adequate to pass most specifications."

Normal latex foam, whether made from natural rubber or synthetic rubber, is no more inflammable than standard upholstery fillings and has proved its value over many years in a large number of applications. The new flame-resistant latex foam should provide manufacturers with a high quality product suitable for a range of applications where extremely good flame resistance is essential including upholstery for ships, trains, aircraft, etc.

* * *

Personal

Mr. H. de G. Gaudin (chairman, British Northrop Sales Co. and deputy chairman, British Northrop Ltd., has informed the Board that he will relinquish his executive appointments on 30th September. He will remain a director of the parent company and will undertake special researches and other assignments contributing towards the future development of the company's interests. Mr. Gaudin has served the company for 38 years, and has taken a leading part in its development from a comparatively small undertaking to the major organisation with a world-wide reputation which it is today, and he is held in high esteem both within the company itself and in the very wide circle of its customers and friends.

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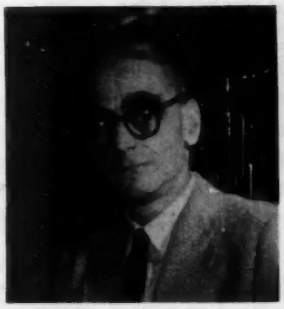
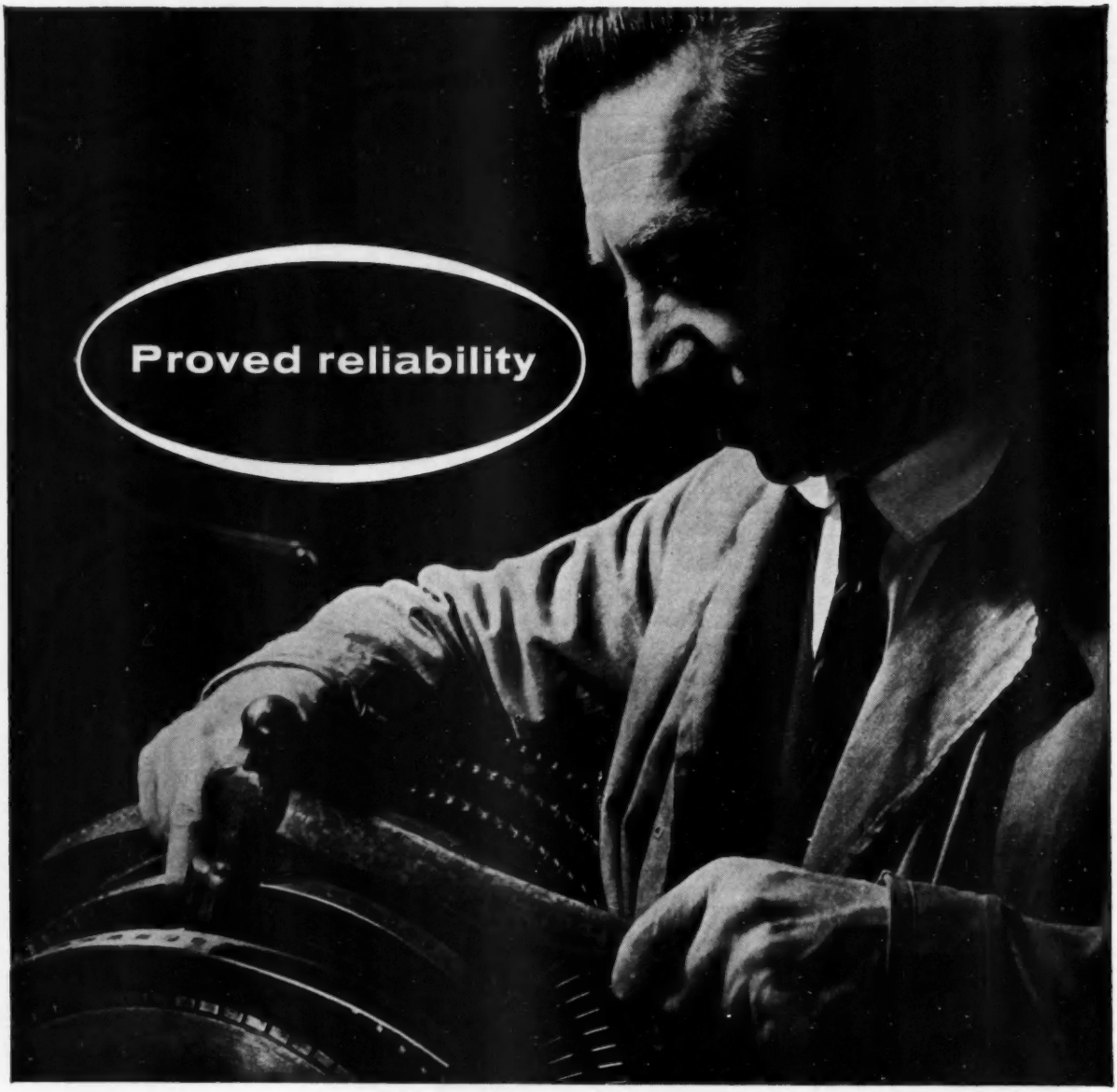


Mr. L. Morris (lecturer in textile chemistry, Manchester College of Science and Technology), has been appointed

BEHIND THE MACHINE... in small steam turbines



It is recognised that, where steam is needed for process work or heating, a back pressure or extraction steam turbine-generator can, in nearly all cases, pay for itself over a short period of years, by the savings made in electricity costs. But even where a machine will pay for itself, experienced engineers still demand plant of proved reliability and robustness and this is why more small steam turbine-generators are bought from AEI than from any other British manufacturer.

Riveting the blade shrouding of a small steam turbine at Trafford Park. Machines like these are built to proved designs by skilled craftsmen who know their jobs 'inside out'. They know, as well, that the quality of all the materials they handle is assured by the most rigid and up-to-date inspection system in the world.

AEI makes **geared turbine-generators** from 300 kW and **direct-coupled** machines from 5,000 kW. Designs include **back-pressure** and **extraction** machines. Geared sets can be **self-contained** with the condenser integral with the exhaust casing.

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dyeworks director for Cornard Knitting Mills Ltd., Sudbury, Suffolk, where he will be in charge of the firm's new dyeworks. Mr. Morris joined the college to run the new dyehouse and textile chemistry department when it was formed five years ago. He was himself a graduate of the old textile chemistry department in 1931, after which he served for a period with I.C.I. Ltd., at Blackley, later joining Vantona Textiles Ltd., as chief chemist, then moving to Allied Colloids (Bradford) Ltd. Throughout his career Mr. Morris has taken an active part in the affairs of the Textile Institute, having helped to inaugurate the Bolton Section of which he was secretary for fourteen years and chairman for two years. He has also served on the Institute Council and has been awarded the Institute Medal.

* * *

Wool Programme in U.S.

Multi-million dollar programme of wool promotion in the U.S. was disclosed recently by Sir William Gunn, chairman of the International Wool Secretariat. He said: "In the promotion programme during next year, the American Council and the New York branch of the I.W.S. will embark on an intensive expanded programme to increase wool consumption at all levels of the textile industry." The American Council would continue its promotion and education efforts with the mills and knitters but branch out to cutter and retail levels in the areas of merchandising, sales promotion and sales training. Education work would include the distribution of information about wool fabric, with instruction and demonstration of wool products to schools, fraternal groups and community organisations.

* * *

Merger in Tapes, Webbings, etc.

Small and Parkes Ltd., Hendham Vale Works, Manchester 9 and William Kenyon and Platts (Narrow Fabrics) Ltd., Dukinfield, have completed a manufacturing and marketing arrangement. Small and Parkes Narrow Fabrics Department has been merged with William Kenyon and Platts (Narrow Fabrics). Also included in the merger is the patented nylon bonded tape process and service hitherto undertaken by another Kenyon company, William Kenyon and Sons (Synthetic Fibres) Ltd. The re-formed company, to be known as William Kenyon Platt and Parkes Ltd., will operate from Railway Street, Dukinfield, and will be one of the largest manufacturers of spindle tape and narrow fabrics in the U.K.

* * *

Bonding Fabrics to Flexible Foam

Two adhesives, one aqueous and the other a two-part mixture, have been developed by B.B. Chemical Co. Ltd., Ulverscroft Road, Leicester, with a calculated viscosity that enables spray or roller-application. The aqueous adhesive, when applied evenly to a fabric, gives a dry weight of approximately ½ oz./sq. ft. and will dry in 75 secs. at 200°C. or within 60 mins. at room temperature: it will cure by heating for 8½ mins. at 140°C. or by allowing four days at room temperature.

With the two-part, solvent-based synthetic rubber adhesive, which requires dilution before spraying, the bond can be safely handled after drying for 50 - 60 mins. at room temperature. This time can be reduced to 10 mins. by drying at 70°C. Cure time is again four days at room temperature when this period is over. Full resistance to dry-cleaning fluids is claimed.

All that is required in marrying the two materials is light pressure after they are brought together. It is stated that laboratory tests show bonded samples suffer no deterioration from immersion in white spirit for 3 hours at 25°C., with only a slight drop in bond strength after 1 hour in trichlorethylene or perchlorethylene at 70 - 80°C. Even after the hour in "trike", full bond strength is stated to have returned on drying out the fabric.

* * *

New Reactive Blue

Procion Navy Blue H3R (I.C.I. Dyestuffs Division) is a new homogeneous reactive dye of outstanding interest to the textile printer. The solubility and building-up characteristics of the new dye are said to be excellent, enabling attractive deep navy shades to be obtained without difficulty on cellulosic fibres and natural silk. It has good print paste stability and, in addition, displays good washing-off behaviour. This interesting and attractive combination of printing properties, coupled with its economy in use, make Procion Navy Blue H3R of great value not only in self-shades for full navies, but as the basis of mixtures for a wide range of browns, olive greens, khakis, drabs, greys, etc.

* * *

Wool Goods to 150 Countries

Britain's wool textile industry regularly exports more than £160-million worth of wool tops, yarn and cloth annually to more than 150 countries and "it could do better still if it had free access to such markets as South America and the countries of the Communist bloc," writes Godfrey E. Hicks (National Wool Textile Export Corporation) in the Board of Trade Journal. "The industry recently took a leading part in the British Trade Fair in Moscow, which revealed an immense potential in Russia for the sale of fine worsted suitings, colourful women's wear fabrics from Yorkshire, and tweeds and overcoatings from Scotland and the West of England. The Corporation has for some years conducted large-scale promotional campaigns in the industry's four largest exports markets—the United States, Canada, South Africa and West Germany —but it does not overlook the possibility of expansion elsewhere.

Promotion for British Wool Textiles

After considering the results of a home market survey carried out by a research bureau, the Wool Textile Delegation has decided to take steps to formulate a pilot promotional scheme for the products of the British wool textile industry in the home market, conceived in a way which will commend itself to the whole industry. At a press conference in Bradford recently it was also stated that, throughout discussions so far, the Delegation has had the advantage of close co-operation with the International Wool Secretariat "who have generously offered to have an outline of a short-term impact and merchandising campaign prepared at their expense through the I.S.W. advertising agents."

This pilot promotion is to take place in the West Riding of Yorkshire, so that members of the industry may themselves judge its effectiveness. The scheme in outline will probably be submitted to a full meeting of the Delegation, and the next step will be to decide how to collect the funds to finance it. At that stage, the project will probably be referred to the various trade federations. The Delegation states that "such a pilot campaign, if agreed and if it proves satisfactory to the industry and successful in its promotional effect, would be a valuable preliminary to mounting a national campaign on similar lines, for which it is then proposed the Delegation should immediately proceed to plan in consultation with the I.W.S."

* * *

World Wool Consumption

World wool consumption estimates by the Commonwealth Economic Committee indicate that, comparing the first and second quarters of this year, raw wool consumption by ten leading countries of the free world increased by 2%. As the second quarter had fewer working days than the first, the daily consumption rate is estimated to have increased by nearly 7%. This is described by the Committee as the first significant quarterly increase for more than a year. Seasonally adjusted consumption in the U.S.A. rose by 15%—mainly in apparel type wool—and the daily consumption rate was higher in all the major consuming countries except Germany, Japan and Sweden.

Daily production rates in tops, yarn and fabrics were 3 to 4% higher than in the first quarter. Improvement in yarns and fabrics was marked in Italy and France while the U.K. showed increases in tops and yarns. The U.S.A. showed marked increases in all three sections.

NEW COMPANIES

William Handley and Sons Ltd. Private. Reg. May 25. Capital £5,000. Merchant converters. W. H. Handley, 17 Montrose Avenue, Southport, and F. W. Handley.

Kessler and Co. (Oldham) Ltd. Private. Reg. May 29. Capital £3,000. Cotton, wool, etc. manufacturers. J. H. Dean, H. McCallum and F. Wilke. Registered Office: 9-11 Queen Street, Oldham.

Lebutley Warping Co. Ltd. Private. Reg. May 29. Capital £2,000. Spinners, weavers and finishers. F. T. Leach, G. Worsley and L. Butterworth. Registered Office: Bowling Alley, Rastrick, Brighouse.

Maiga (Worsteds) Ltd. Private. Reg. June 16. Capital £1,000. E. Weiss and U. Duhl. Registered Office: 41 South King Street, Manchester.

W. Rosen (Manchester) Ltd. Private. Reg. July 6. Capital £1,000. Manufacturers of worsted, plush, velvet, etc. Mrs. R. Goodman and S. Goodman. Registered Office: 7 New Bridge Street, Manchester 3.

W. and H. Rycroft Ltd. Private. Reg. June 20. Capital £15,000. Wool, cotton, etc. manufacturers. J. W. Leach and H. Leach. Registered Office: 59 Well Street, Bradford 1.

H. Haigh and Co. (Exports) Ltd. Private. Reg. June 29. Capital £1,000. Tops, noils and waste merchants. P. D. Haigh and A. H. Ramus. Registered Office: 31 Canal Road, Bradford.

Wilson and Herdan Ltd. Private. Reg. June 30. Capital £10,000. Spinners, weavers, manufacturers and finishers. A. G. Davies and M. L. S. Passey. Solicitors: Simpson, Curtis and Co., Leeds 1.

A. S. Taylor Ltd. Private. Reg. July 4. Capital £2,000. Manufacturers of woollen goods and worsteds. A. S. Taylor and Mrs. E. Taylor. Registered Office: Vivary Bridge Mill, Colne, Lancs.

Texpol Ltd. Private. Reg. July 4. Capital £1,000. Textile merchants and manufacturers. R. Zilker, S. Zelker and G. S. Murray. Registered Office: 45 Conduit Street, W.1.

Oakdale Textile Co. Ltd. Private. Reg. May 30. Capital £1,000. Mrs. D. M. Connor and G. O'Brien. Reg. Office: 8 Oakdale Avenue, Bradford.

Focus on

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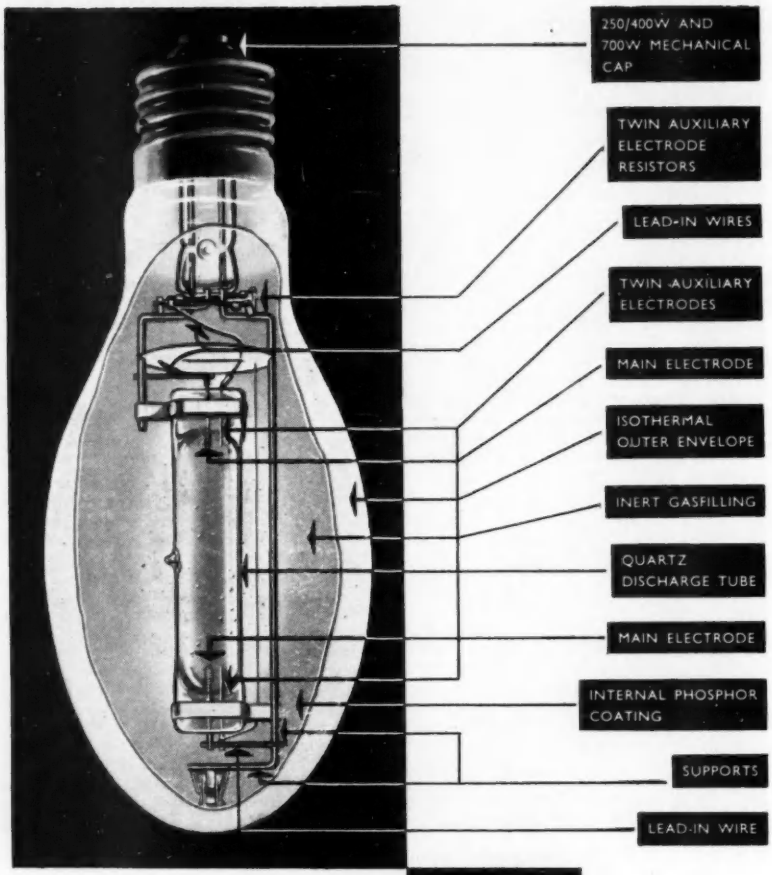
MERCURY DISCHARGE LAMPS

Long life, high efficiency and improved colour rendition



The unique Isothermal shaped envelope of this range of lamps—seven ratings, 50 to 1000 watts—ensures long life of all components by means of optimum heat distribution, it prevents deterioration of the excellent colour rendering property of the phosphor.

The high pressure quartz discharge tube is mounted by an exclusive system that defeats vibration and wastage of light, and reduces the number of working parts.

This mechanically made discharge tube is sealed in nitrogen and is filled with argon and mercury. Special features of its construction are twin auxiliary electrodes on ratings above 250 watts to ensure reliable ignition even at temperatures as low as -40°C.

An exclusive feature is a new capping process, which screws the glass into the cap without cement.

- No voltage grades—all lamps suitable for 200/250 volts. Stock problems eliminated!
- Universal burning position.
- Largest range—50 to 1000 watts through seven ratings.
- Unique Isothermal shape ensures long life and colour maintenance.
- 250-400 & 700 watt have mechanical caps. No cement means no loose caps—ever!
- Mechanical manufacture of all components ensures extreme reliability and quality constancy.

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RECENT TEXTILE PATENTS

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842,790 Printing of Crease-Resist Fabrics

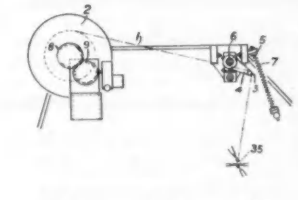
LINEN INDUSTRY RESEARCH ASSOCIATION, *Antrim, Northern Ireland.*

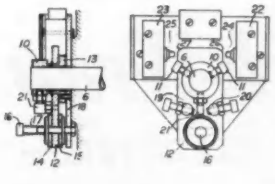
Fabrics, made from fibres of natural cellulose or of regenerated cellulose alone or from mixtures of fibres containing man-made polymer fibres with natural or re-generated cellulose fibres which have already received a resin treatment, can be printed with vat, azoic or other suitable dyes that would normally dye or colour the unheated fibres. The light and wash fastness of the printed fabrics are at least as good as those of similar fabrics to which the colouring was applied before the resin treatment. In one example, bleached, and caustic soda-shrunk dress linen, containing urea-formaldehyde resin was screen-printed with a past containing 15 parts of a dispersion of the vat dye 16 17 dimethoxy-violanthrone, 60 parts of British Gum thickener, 5 parts of glycerol, 14 parts of potassium carbonate, and 6 parts of sodium formaldehyde sulphoxylate. After drying, the fabric was steamed for 10 minutes at 100°C., washed with a solution containing 1 part of sodium perborate in 1,000 parts of water, rinsed and soaped in a solution containing 1 part of soap in 1,000 parts of water. The fabric was finally washed and dried. The penetration of the print of the resin-finished fabric was superior to that on a similar fabric not containing resin. The crease recovery angle of the fabric (warp way) before printing was 125° and after printing also 125°.

844,453 Tension Control for Warp Beams

K. LIEBRANDT, *Naila-Oberklingensporn, Germany.*

Control means for regulating the driving speed of a warp beam of warp knitting machines to ensure that the fabric produced will always be uniform. The warp threads 1 run from the beam 2 over a tension roller 3 to the knitting tools 35. Tension roller 3 is mounted on a bell crank consisting of arms 4 and 5 secured to a shaft 6, and arm 5 is maintained by a compression spring 7 at a position corresponding to the normal speed of operation. Beam 2 carrying a gear 8 is driven by means of an infinitely variable gear 9. Any changes in the tension of the threads running over roller 3 are transmitted to arm 4 to move the same and thereby turn shaft 6 in one direction or the other. Shaft 6 also carries a bushing 10 which has a projecting stop 21. Behind bushing 10 shaft 6 further carries a control member 12 on a bushing 13 which is freely rotatable. The movement of member 12 is retarded by a pair of friction discs 14 and 15 which are pressed from opposite sides by bolt 16 and a spring 17. These friction means are mounted on a plate 18 which is secured to the machine. This friction brake ensures that member 12 when displaced from its central rest position will remain in that displaced position. For adjusting member 12, it is provided with adjustable stop members 19 and 20, adapted to transmit the movement of member 21 to control member 12. Mounting plate 18, further carries on each side of member 12 a switch 22 and 23, each with a spring-controlled button or pin 24 and 25. Thus, depending upon whether member 12 is pivoted toward the right or left by member 21, the corresponding one at camlike edges 26 and 27 at the right and left upper ends of member 12 engages and depresses the switch button 24 or 25. Cams 26 and 27 are shaped so as to produce a quick make or break actuation of the switches.





844,527 Centrifugal Can Spinning Frames

A. GARDELLA AND C. GARDELLA, 11 *Piazza della Vittoria, Genoa, Italy.*

Describes a sliver-twisting device for use in centrifugal can spinning frames in which the twisting is automatically restarted after an accidental or voluntary break. The centrifugal can spinning device comprises a drafting device, a vertical rotable guide tube positioned adjacent the drafting device to receive downwardly moving sliver with means in the tube for pre-twisting the sliver extending through it. A spinning can is disposed coaxially of the tube to receive sliver emanating from the lower end of the tube, with openings in the central portion of the can bottom and symmetrically disposed round the longitudinal axis of the tube. Means are provided for causing a smooth flow of air down-wardly through the tube and through the openings in the can bottom.

844,875 Improved Shuttleless Loom

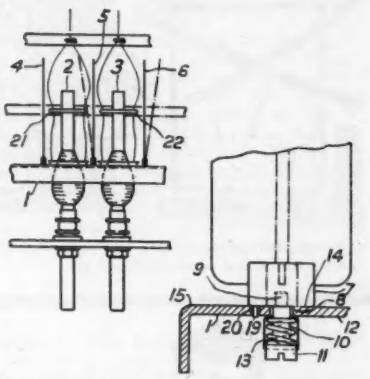
WEAVING RESEARCH AND TEXTILE COMMISSION AGENTS LTD., *Ballamoar Castle, Jurby, Isle-of-Man.*

A loom has three weft inserting spear heads (each drawing yarn from a stationary weft package) which move simultaneously and follow each other through the warp shed. The two outer spears lay discontinuous lengths of weft thread in the warp shed and the intermediate spear lays a continuous weft thread, the latter being progressively shedded between the spear heads as the latter move through the warp.

845,450 Separators on Ring Spinning etc., Frames

RIETER AND CIE, *Winterthur, Switzerland.*

Describes a separator fitted on ring spinning and twisting frames in which one end of the separator is connected resiliently with the ring rail to permit deflection. A ring twisting frame has a ring rail 1 and spindles 2 and 3 and separators 4, 5 and 6 are carried by the ring rail bank. Each separator is fitted to the ring rail by a screw 9 which extends into a base 7 of the separator through a bore 8 in the ring rail. An unthreaded part 10 of the shank of the screw is surrounded by a spring 13 which is compressed between the head 11 of the screw and the lower surface 12 of the ring rail. The base 7 has a flat bottom surface 14 which is urged against the adjacent surface 15 of the ring rail by the pressure of the spring. There is a relatively large clearance between the diameter of the bore 8 and the part 10 of the screw so that the separator can be inclined from the vertical. The base 7 is secured against rotation by an extension 19 which engages, with adequate clearance in the direction of pivoting, in a slot 20 in the ring rail. The rings 21 or 22 which are provided to limit ballooning, can act as stops. The separator plates can be pushed apart by hand, when a bobbin is pieced up or doffed, so that more space is available for manipulation. The base part 7 will turn on to its edge and compress the spring 13 and when the deflecting forces applied to the separator plates are removed, the plates snap back into the normal operative position under the action of the springs 13.



845,849 Producing a Uniform Fleece

FLEISSNER AND SOHN MASCHINENFABRIK, *Egelsbach, Offenbach/Main, Germany.*

Apparatus for producing a uniform bat of loose fibrous material comprises a housing 12 with a chute 13 into which the

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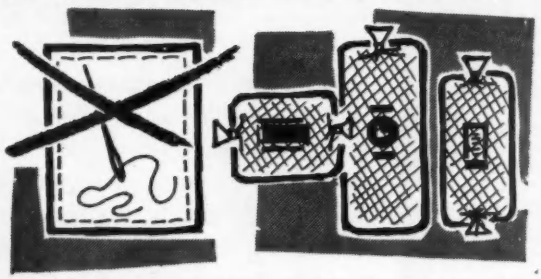

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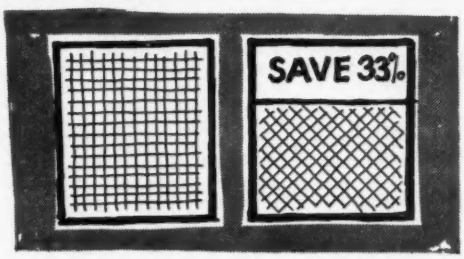

'Quick-Wrap' means less wastage, you use about 33⅓ less Hessian and the tubes can be used time and time again.

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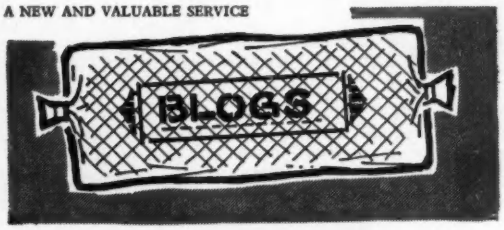

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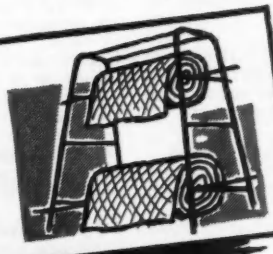
'Quick-Wrap' *can be mounted on the dispenser illustrated (supplied by Quick-Wrap Tubing Co. Ltd. at a nominal cost) for easy application.*



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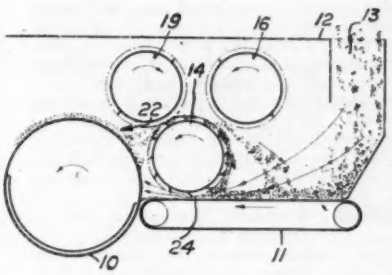


loose material is inserted and from which it then drops upon a conveyer belt 11. Behind the conveyer belt, a perforated drum 10 is mounted, at the inside of which a strong suction is produced. A needle drum 14 is mounted so closely above the conveyer belt that they will only be separated by a narrow gap 24 which just allows the needles of drum 14 to pass at a little distance from the upper surface of the belt. The drum is also spaced at such a little distance from the perforated drum that it will be within the effective range of the suction from the drum. This suction will then be effective within the gap 24 and draw the loose material fed by the conveyer belt toward the surface of drum 14. Above drum 14 a needle roller 16 is mounted and driven in a direction opposite to the action of drum 14. This roller strips the excess material from the bat of material formed on drum 14 and throws the excess back upon the conveyer belt. At the left side of drum 14 another needle roller 19 is mounted. The needles of this roller engage between the needles of drum 14, strip off the material from the latter and throw it in the direction toward the drum 10. Since drum 14 and roller 19 are mounted within the effective range of the suction of drum 10 and have only a small intermediate gap 22, the suction from drum 10 will act upon this gap and also draw the material from the surface of drum 14. Roller 16 is spaced at a greater distance from drum 14 than roller 19 since it only wipes along the surface of the bat formed on drum 14 and only combs off the excess fibres.

846,287 Crease-Resist Finish to Fabrics

BLEACHERS' ASSOCIATION LTD., *Blackfriars House, Parsonage, Manchester.*

A cellulosic fabric having a drip-dry crease-resisting finish is produced by treating the fabric in aqueous medium with a film-forming polyol, a cross-linking agent, and a water-soluble polyester which comprises structural units connected by ester linkages and which contains free acidic groups. In one example, the method is used to produce drip-dry finish on cotton poplin. 1 gram of polyvinyl alcohol 97% hydrolysed and of low viscosity is dissolved in 80 mls. hot water. When cooled, 25 grams of tetra methylol acetylene diurea, followed by 2 grams of polyester condensation product dissolved in 20 mls. water and 5 grams of 40% W/V solution of formaldehyde are then added. A piece of poplin which has been suitably prepared is passed through the solution and dried and cured for 3½ minutes at 130°C. The material may be washed off in soap and soda ash. A good crease resist effect when wet is obtained, with superior resistance to abrasion stability and washing, and garments made from the fabric requiring little or no ironing after washing.

846,327 Underwinding Motion for Ring Spinning, etc., Frames

PRINCE-SMITH AND STELLS LTD., *Keighley.*

An electrically driven ring spinning, doubling and twisting machine apparatus is provided comprising a reversible motor (auxiliary to the main driving motor) which is arranged automatically to move the ring-plate in either direction between the normal winding position and the underwinding position. Switching means are provided for stopping the auxiliary motor when either position is reached, and for stopping the main driving motor, when the underwinding position is reached.

846,712 Fabric Feeding Apparatus

MASCHINENFABRIK BENNINGER A., *Uzwil, Switzerland.*

Apparatus for feeding a web, in which the web is looped successively over rolls at least some of which are arranged to be driven, each driven roller being provided with independent driving means having a flat speed-torque curve and arranged to rotate at a speed less than their rated speed. The power transmitted by the driving means is arranged to be sufficient to overcome the frictional resistance of the rolls, and the pull necessary for feeding the web is provided separately.

846,714 Improved Loose Reed Loom

MASCHINENFABRIK RUTI AG. VORMALS CASPAR HONEGGER, *Ruti, Zurich, Switzerland.*

Describes a loom having a loose reed with one reed baulk arranged for locking in operative position by pivotable brackets which have associated locking cams movable between operative position in which the baulk is so locked, and an in-operative position. The brackets are supported on shafts spaced with the plane of the operatively positioned reed so that a plane containing the axis of the shaft and tangential to the baulk at that side remote from the reed, makes with the reed an angle of between 50° and 130°. The brackets are free to swing clear of the baulk when the cams are in the inoperative position, if pressure is applied to the reed as a result of a shuttle becoming trapped in a shed.

846,802 Washing Spread-out Printed Cloth

"S.T.S." STAMPERIA TESSUTI SERICI, SOCIETA DI GESTIONE, *Via Milano* 14, *Saronno, Italy.*

A machine for washing spread-out printed cloth in sheet form comprises a tank for the washing liquid, several series of rollers, arranged in the form of concentric polygons. At least one series of rollers are in the tank and at least one series are without the tank in order that as the cloth passes around the rollers it will proceed in a spiral path and will periodically pass into and out of the tank. Spraying nozzles, adjacent each non-immersed roller, are arranged to sprinkle the cloth, and rotary brushes brush a surface of the cloth towards the completion of the washing operation.

848,913 Removing the Thread from Weft Bobbins

K. MOOS, *Uster, im Gschwader (Switzerland).*

A machine for the removal of the thread remainder from loom-bobbins. The machine comprises a slot shaped guide supporting the bobbins conveyed on their heads, with their shanks pointing downward, and an endless conveying device makes frictional contact with the bobbins at their heads and conveying them while they are being rotated at the same time in the direction of unwinding the thread. A thread loosening device is provided with a soft adhering body, moving with a rotational motion from above to below over the bobbin shank. Means are provided for the intermittent stoppage of the conveying motion, limiting it to a rotation of the bobbin about its own axis in the direction of unwinding. A thread removal device has immediately in front of it a pipe for compressed air, the stream of compressed air being arranged to force the end of the thread unwound from the bobbin into the neighbourhood of the removal device past which the bobbin is conveyed and which removes the residual thread while the bobbin is being rotated about its own axis.

848,963 Wet Treatment of Loose Material

B. THIES K.G., *Spezial-maschinenfabrik, Coesfeld Westfalen, Germany.*

Apparatus for the liquid treatment of loose material includes at least one pair of cylindrical containers for the material disposed one above the other around a central delivery passage with their axes vertical. Each container has an impermeable cylindrical outer side wall and liquid-permeable top and bottom walls. The bottom wall of the upper container is spaced from the top wall of the lower container to define between them a liquid distribution chamber having an impermeable wall and communicating with the interior of the delivery passage for the admittance of treatment liquid. Treatment liquid under pressure can be pumped into the delivery passage whence it will flow into the distribution chamber between the containers and will pass respectively upward and downward through the two containers and through the material in the generally axial direction.

849,114 Fire-Resistant Fibrous Webs

COURTAULDS LTD., *London.*

A fibrous web having appreciable fire-resistance is obtained by forming a web from a mixture of fibres containing up to 50% by weight of cellulose acetate fibres and at least 50% of alginate fibres so that the combined percentage of cellulose acetate fibres and alginate fibres is at least 90% by weight and then rendering the acetate fibres adhesive to bond the fibres into a self-supporting web. In one example, 60 parts of 2·5 denier, 3 inch calcium alginate staple fibres and 40 parts of 5 denier, 2½ inch secondary cellulose acetate staple fibre were blended together on a carding machine to form a web about 1½ inches thick. The web leaving the card was sprayed with dimethyl glycol phthalate containing 20% of trichlorethyl phosphate as fire-proofing agent, so that the fibres retained 10% of the plasticiser based on the weight of the acetate fibres. The treated web was then lightly pressed between plates and heated at 120°C. for 10 minutes.

849,540 Yarn Metering Device

A. DE NEGRI, 22 *Via Michele Ferrara, Caserta, Italy.*

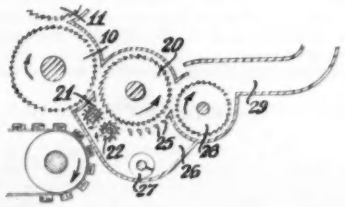
A yarn metering device having the possibility of being pre-set for a desired length

of yarn to be metered and automatically stopped when the length has been reached. A unit is provided comprising guide means for a yarn coming from a delivery machine and directed to a collecting device, including at least one pulley whereon the yarn is wound through a complete turn to originate a drive with no slippage. A pair of counters are driven by the pulley, with a device for the return to zero, during measuring, from a pre-set length for one of the counters and with an accumulation of the measure on the other counter, to allow the simple repetition of the presetting. Means are provided to cause the yarn to be cut when one counter has reached the zero value, and means are operable to stop the pulley when the cutting action occurs and simultaneously stop, by an electrically controlled action, the operation of the collecting device for the metered yarn.

849,548 Improved Fibre Cleaner

DODD INVESTMENTS LTD., *Hartford Grange, Wellington Road, Oldham*, R. C. YOUNG and R. A. RUSCA.

A cleaner for fibres especially designed for removing trash from ginned cotton. 10 is the lowest of the processing cylinders, and there are other cylinders 11 each provided with its own cleaning structure, for working the fibres after they pass from the opener cylinder. The cotton fibres are doffed from cylinder 10 by a second cylinder 20 having forwardly inclined teeth. The adjacent surfaces of cylinders 10 and 20 move in the same direction with the surface speed of cylinder 20 greater than that of cylinder 10. A combing cylinder 21 having rearwardly inclined teeth is mounted adjacent to cylinder 20 and rotates so that both surfaces move in the same direction. The surface speed of cylinder 21 is, however, slower than that of cylinder 20, and speeds of cylinder 21 of from 1/2 to

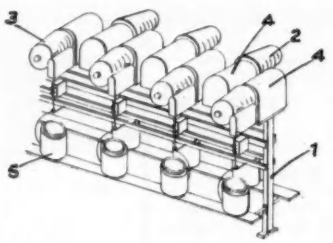


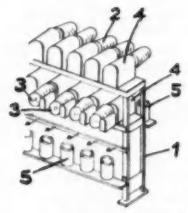
1/12 the speed of cylinder 20 have been found satisfactory. Some of the fibres cling to the teeth of cylinder 21 and are removed by a doffing cylinder 22 having forwardly inclined teeth, the adjacent surfaces of cylinder 21 are cylinder 22 moving in opposite directions. Cylinder 22 is also mounted adjacent to cylinder 20 the surfaces of both cylinders moving in the same direction but the surface speed of the cylinder 20 is greater than that of doffing cylinder 22. All of the fibres which are first on cylinder 20 are subjected to the combing action of cylinder 21, and are in part retained on cylinder 20 and in part returned to it from cylinder 22. The loosened fibres containing trash are carried past grid bars 25 adjacent cylinder 20 through which the trash is ejected into a trash box 26 and removed by a conveyor screw 27. The cleaned fibres are doffed from cylinder 20 by a usual type doffing cylinder 28 and conveyed by air through fibre conveying manifold 29.

849,779 Multi-Head Winding Frames

BARMER MASCHINENFABRIK AKT. GES., *Wuppertal-Oberbarmen, Germany*.

A multi-head winding frame in which winding heads are arranged in one or more rows extending longitudinally of the frame, with winding positions projecting from both sides of the frame. The gear units of all the winding heads are so disposed that the vertical plane containing the longitudinal axis of the frame passes through the units. Two examples of the method





are shown and in each case the winding heads, consisting in each case of gear units 4 and winding positions proper 2 and 3, are arranged on a machine frame 1. The winding positions 2 project on one side of the frame and the winding positions 3 project on the other side. The original packages 5, are re-wound into a package form suitable for actual purpose of use while on the frame.

849,835 Fibre Feeding Apparatus for Drum Driers

FLEISSNER AND SOHN MASCHINENFABRIK, *Egelsbach, Frankfurt/Main, Wolfsgartenstrasse 6, Germany*.

Fibre feeding apparatus for drum driers consists of plucking means which plucks apart and loosens the fibres and then discharges in a tree fall upon a movable surface. The surface is perforated, and through these air is drawn to hold the material by suction on the surface to be advanced to a drum drier, or the like. Since the fibres are not blown upon the drum but drop in a tree fall, the kinetic energy of the loose fibres is already reduced so considerably, as the material passes through the air, that the fibres will be drawn by the suction toward those points of the surface which are still bare of fibres or only thinly covered.

850,126 Crimping Acrylonitrile Fibres

DOW CHEMICAL CO., *Midland, Michigan, U.S.A.*

An improved method for crimping fibres or filaments that consist of and are fabricated from acrylonitrile polymers. The fibres or filaments may be crimped during their manufacture while they are in an aquagel form and contain an amount of water that is at least equal in weight to the quantity of water-swollen polymer that is in the aquagel. The method comprises applying a closely controlled crimp-effecting force to the aquagel fibres or filaments for a period of time not longer than 5 seconds to impose a zig-zag crimp pattern. The fibres or filaments are then transferred while they are in a completely unrestrained condition and free from physical extending influences to a drying means. Finally, drying and dehydrating is carried out on the fibres or filaments while they are maintained in a completely unrestrained and free-to-shrink condition.

849,388 Magnetic Weighting for Drafting Mechanism

SACO-LOWELL SHOPS, 60 *Batterymarch Street, Boston, Massachusetts, U.S.A.*

A drafting mechanism includes a three-roll stack comprising a driven ferrous roll, with a resilient-surfaced bottom drafting roll driven from and resting on it, and an overlying ferrous roll driven from the bottom drafting roll. The bottom drafting roll includes magnetic weighting means to press the bottom drafting roll into firm pressure contact with the driven roll.

849,704 Yarn Tensioning Device

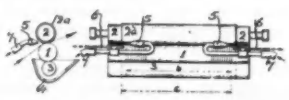
LINDLY AND CO. INC., 248 *Herrick Boulevard, Mineola, Long Island, New York, U.S.A.*

Yarn tensioning equipment, which is particularly suitable for installation on creels in warping. The tension is applied and controlled by means of electromagnetic force and the tension applied to the yarn ends are controlled by a simple electrical circuit making it possible to vary the tension on all of the yarn ends simultaneously from a single control point. A preferred embodiment also provides individual regulation of the tensioning devices, to compensate for the fact that certain ends going from the creel to the warper pass through more guides than others and are hence subjected to greater drag.

850,485 Yarn Sizing Machine

RUTI MACHINERY WORKS LTD., *Ruti, Zurich, Switzerland*.

A thread sizing machine comprises a size feeding roller 1, a pressure roller 2, an application roller 3 and a sizing box 4. The feeding roller is made of steel and is provided with a frosted or roughened surface, and may also be heated if required. The pressure roller has a soft rubber covering 2*a* which has a width *c* wider than the width *b* of a group of threads under treatment, and around which a cloth may be wound to prevent the ends of the rubber covering contacting the ends of roller 1. In order to remove excess sizing agent from the feeding or pressure roller, blower means in the form of two nozzles 5 are



adjustably mounted on sliding devices 6. The nozzles may thus be set according to the width of the group of threads. The nozzles are connected *via* flexible tubing 7 to a separate, or to a common, source of compressed air, and the compressed air is heated to the required temperature in order to keep the sizing agent in a fluid condition. The nozzles may be set so that the compressed air, the pressure, quantity and temperature of which is regulatable, blows size away from these zones of the pressure or feeding rollers which do not come into contact with the group of threads. Thus

excess sizing of the selvedge threads and their sticking together is prevented.

850,591 Baling Staple Fibre, Raw Cotton, etc.

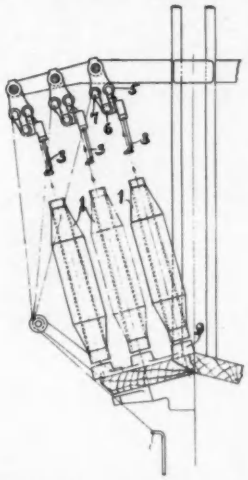
T. SAITO, 46, *4-chome, Higashi-Shinagawa, Shinagawa-ku, Tokyo, Japan.*

A baling press for staple fibre, raw cotton, etc., has a horizontally movable platen on one side of a press box, and the platen is moved outward to enable filling of the press box with material and then advanced inward for performing a horizontal preliminary compression. Having completed the preliminary compression a vertically movable press below the press box is raised for performing a principal compression.

850,839 Winding and Twisting Machines

J. AND T. BOYD LTD. and M. WARNOCK, *Shettleston Iron Works, Shettleston, Glasgow.*

Describes apparatus to provide for tensioning yarn being unwound from a package. 1 denotes each of three cops mounted on a spindle (not illustrated) projecting upward from the frame 9 of the machine. 3 denotes a guide for yarn 4 located close to the upper end of the

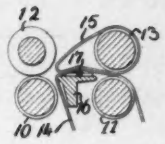


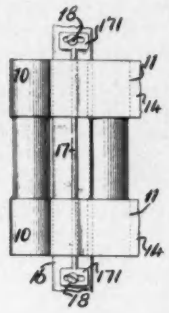
tube 2, so that yarn being unwound from the cop rubs against the end of the tube. Located in series above each guide are three cylindrical tensioning members 5, 6 and 7. The axes of the members 5, 7 are in a plane inclined at an angle in the region of 10° to the horizontal, the axis of intermediate member 6 being parallel to but below the axes of members 5, 7.

851,927 Improved Drafting Apparatus

T.M.M. (RESEARCH) LTD., *Hartford Works, Oldham.*

A drafting apparatus comprises front and back bottom rollers 10, 11; front and back top rollers 12, 13; lower and upper aprons 14 and 15 which are respectively guided about the back rollers and a nose tensor bar 16 for apron 14. Mounted upon tensor bar 16 is a subsidiary bar 17 over which the apron 14 passes and which serves to deflect the apron towards the compansion apron 15, in such manner as to augment the pressure upon the material at the point at which it passes between the aprons over bar 17. The bar 17 is arranged to lie flat upon the upper face of bar 16, and it may be made sufficiently long to





serve the aprons of a number of adjacent drafting units. In order that the position of the pressure point in relation to the nip of the front rollers may be regulated to suit fibres of different staple length it is necessary that the position of bar 17 upon tensor bar 16 should be adjustable without disturbing the setting of the tensor bar itself. This may be achieved in any one of a number of alternative ways. For example, the bar 17 may be furnished with slotted lugs 171, 171 through which pass setscrews 18 by which it is secured upon the tensor bar, the length of the slots being sufficient to permit an adequate range of movement of bar 17 towards or away from the front roller nip.

852,063 Stop Motion for Lace Machines, etc.

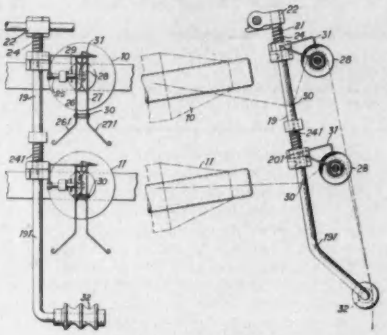
LACE RESEARCH ASSOCIATION, 1948 *Glaisdale Drive, Bilborough, Nottingham.*

Describes improved thread fault responsive primarily applicable to means for detecting broken or slack threads in lace machines. A number of units are provided, each for assembly on a bar in the machine which extends across the sheet of threads, each unit incorporating a number of feelers each individual to a different thread and an opposed feeler common to several threads. Electric conductor means are connected to the individual feelers and the common feeler respectively, for connecting them to an electric circuit when the units are assembled on the bar. Both the individual feelers and the common feeler are arranged for detecting action on the threads in such manner, that unbroken threads maintain them in a relationship with the electric circuit unoperated, and broken threads allow relative movement between them for rendering the electric circuit operative.

852,260 Tension Device for Twisting Machines

PRINCE-SMITH AND STELLS LTD., *Keighley.*

A device for the creels of twisting machines for guiding the yarns as they are drawn from their packages. The creel comprises an arm 19, which is hinged upon a member 21 which is supported by a bracket 22 and a spring 24 tends to hold the arm in the normal operational position. The arm carries an off-set 25 upon which are supported two spaced wire guide members 26, 27. Aligned with the space between these members is a disc-type



tension device 28, controlled by a spring 29 and located in alignment with the axis of the package 10 or 11. Upon the lower parts of members 26, 27 there is mounted a loop 30 which is freely slidable, but prevented from passing over the ends of members 26, 27 by the bent portions 261, 271. Above each of the tension devices there is a fixed guide 31 to facilitate the operation of threading the yarn through the tension device. Each yarn is drawn from its package beneath the loop 30 and passed over the tension device, the guide 31 serving to lead the yarn correctly to the latter. Each yarn is next taken over a roller 32 and thence to the traveller of the twisting unit (not shown). The loop 30 slides freely upon the guide-members 26, 27 in response to variations in tension of the yarn drawn over the end of the package. The loop maintains a sufficient degree of tension in the yarn, a decrease in tension being accommodated by a downward movement of the loop and an increase in tension is accommodated by an upward movement of the loop. In this manner the formation of snarls due to variations in yarn tension. The arm 19 is articulated at two places, at 20 and also at 201. A spring 241 serves to maintain the lower part 191 of the arm in alignment, but the arrangement permits the arm and the members to be swung aside to provide access to the creel.

854,848 Pneumatic Thread Tensioning Device

RUTI MACHINERY WORKS LTD., *Ruti, Zurich, Switzerland.*

A pneumatic thread tensioning device in which the thread is caused to run between a fixed part and a tensioning plate seated over a suction opening in the fixed part, which opening is connectable to a source of vacuum. The tensioning plate is in the form of a flat, thin diaphragm and the fixed part is provided with means having at least one thread-guiding aperture located below the plane of the plate seating surface.

854,970 Loom Picking Mechanism

HUYCK CORPORATION, *Rensselaer, New York, U.S.A.*

A picking mechanism comprises actuating mechanism for the picker including an electromagentic clutch comprising a driving clutch engageable upon energisation of an electromagnet, with a driven clutch. Means actuated by the driven clutch impart motion to the picker. Means are also provided for controlling the energisation of the electromagnet, includes means operable while the loom is in operation to vary the timing of energisation of the electromagnet within a pick cycle of the loom and to vary the amount of energy imparted to the picker by the mechanism.

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